The Therapeutic Gazette

Whole Series Vol. XLVIII | DETROIT, MICH., APRIL 15, 1924 | Third Series Vol. XL, No. 4

Original Articles

The Radical Frontal Sinus Operation, with Results in Sixty-five Cases[1]

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The treatment of chronic suppuration in the frontal sinuses, in the vast majority of cases, calls for some form of radical surgical procedure. The external route offers the only means by which the frontal sinuses can be properly inspected, all dis-

FIG. 1.—Representing type of case in which deformity is unavoidable after operation. Necrosis of the anterior plate of the sinus.

ease removed, and adequate nasal drainage instituted. These are the essential factors in procuring complete permanent cessation of all purulent discharge, together with the thorough removal of the ethmoidal sinuses, when necessary.

In this connection it is interesting to note the development of the present-day external frontal sinus operation.

Before Ogston's paper on "Trephining the Frontal Sinus," which appeared in the *Medical Chronicle,* 1884, the method of treating frontal sinus suppuration was by external drainage through a trephined opening in the anterior plate, a method, I am sorry to say, we sometimes find in use to-day. Ogston was the first to call attention to the importance of free nasal drainage, and it was he who first described enlarging the nasofrontal duct, followed by introducing a drainage tube into the nose from the frontal sinus. Ten years later the skin incision and method of drainage were slightly modified by Luc, and since that time the operation has been generally known as the "Ogston-Luc." Jansen in 1894 described his operation, in which the entire inferior wall was removed, mucous membrane scraped away, and free nasal communication established. Kuhnt, a year later, advocated the obliteration of the sinus by the removal of the entire anterior wall and nasal portion of the floor of the sinus, curetting the infundibulum and anterior ethmoidal cells. Reidel in 1898 was apparently dissatisfied with the results he obtained from the above mentioned

[1]Paper read before the meeting of the Section on Otology and Laryngology of the College of Physicians, at Philadelphia, Pa., November 21, 1923.

Fig. 2.

Fig. 3.

Representing cases with extensive pathology necessitating free exposure with external drainage. Case 2 had necrosis of the posterior plate with exposure of the dura the size of a 25-cent piece.
Case 3 had multiple bone cysts in both sinuses.

Fig. 4.

Fig. 5.

Representing cases of shallow and medium sized sinuses with no perceptible deformity following Killian operation.
Both cases had radical Killian operation on the right side.

operations, so he operated by removing entirely both the anterior and inferior walls, thereby obliterating the sinus by allowing the soft parts to adhere to the posterior wall. It does not require a keen observer to see why this method was not universally adopted, especially in large sinuses. However I have seen cases in which this type of operation was necessary on account of the extensive necrosis.

It remained for Killian in 1902 to describe his classical operation for obliteration of the frontal sinus, with a minimum amount of deformity, by preserving the well-known Killian bridge. This operation, or modification of it, is the one generally in use by the surgeons of to-day. In the literature on this subject during the last four or five years one can see a trend toward less radicalism, especially to be noted in this country. I am of the opinion, however, that there is a certain group of cases in which the Killian operation offers the best means of obtaining a cure.

The chief indications which are given for the radical operation are: first, failure of the intranasal operation; second, presence of fistula, abscess, or indications of necrosis; third, symptoms of intracranial complications; fourth, pain and fever with foul discharge from the frontal sinuses; fifth, persistent headaches associated with ocular discomfort and not relieved by intranasal treatment; sixth, the presence of new growths within the sinuses.

The Killian operation is so well known that its description, at this time, is unnecessary. I wish, however, to mention a few minor modifications which I have found useful in my cases:

First, suturing the eyelids together is a great help in protecting the eye from injury.

Second, infiltrating the skin and deeper structures with one-half of one per cent novocaine and one-to-ten-thousandth adrenalin solution. By this means hemorrhage is very much reduced. This method has recently been mentioned by a Viennese surgeon, and is the method also used when the operation is to be performed under local anesthesia. In addition, I prefer to use general anesthesia by the intratracheal method.

Third, the incision as described by Coakley, namely: instead of one curved incision extending through the eyebrow around the side of the nose and ending below the eye, two incisions are made: the

FIG. 6.—Represents a case with a puckering of the inner canthus of the eye resulting from a single Killian incision. This is obviated by the two incisions recommended by Coakley.

first or upper incision is made through the upper margin of the eyebrow and extending through the periosteum to the bone; the lower incision is started posteriorly to the supraorbital notch and carried in a curved direction downward along the side of the nose, midway between the inner canthus of the eye and dorsum of the nose, to the inferior border of the nasal bone. This prevents puckering at the inner canthus of the eye, which is so frequently seen after the single Killian incision. Imperceptible scars are frequently obtained in this manner. Here also, if one is careful

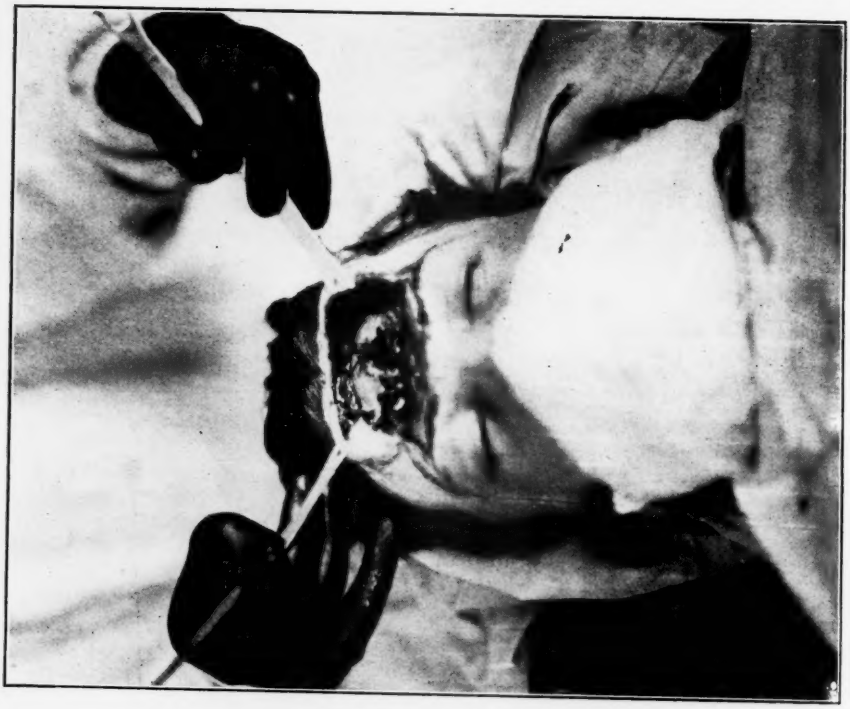

Fig. 8.

Fig. 7.

that the external skin scar is not directly over the resected bone, a depressed scar will be obviated.

Fourth, in extremely large sinuses, which are divided by septa, no overhang is left in the upper margin; the septa are partially removed, and thoroughly examined for accessory cells. In so doing every crevice is explored and all mucous membrane removed. In my experience I have frequently found diseased cells in the body of the septa, which, when not removed, have resulted in failure.

The osteoplastic operation I have never used, because the principles never appealed to me.

Walter G. Howarth, of Edinburgh, described in the July number of the *Journal of Laryngology and Otology* of this year an operation which to me seemed quite adaptable to certain cases. I have followed his method in my last four cases with very gratifying results. This operation, I feel, merits a brief description for the benefit of those who have not seen or used it. He calls attention to the objection brought forward to the two operations commonly in use, namely, the Killian operation and the Ogston-Luc operation. In the Killian operation, he points out, dead spaces are apt to occur behind the bridge, along the ethmoid and elsewhere, which give rise to further trouble. The Ogston-Luc operation, while improving the drainage of the sinus, cannot insure a thorough removal of the ethmoid.

The following is the author's technique: A curved incision is made just under the supraorbital margin and brought down in front of the inner canthus on to the side of the nose. The skin being very thin in this region, a fine scar is obtained. Moreover, as it is in this situation that the shadow falls, often the scar is almost invisible. The incision is carried down to the bone; the periosteum covering the roof of the inner wall of the orbit is then raised; the pulley of the superior oblique is thus detached from its notch, and the whole of the orbital contents displaced outward; likewise, the lacrimal duct is displaced from its groove and retracted outward with the orbital contents.

The sinus is now opened in the situation where one is always likely to find it, just above the lacrimal groove, and with a Citelli's forceps the whole of the floor of the sinus is removed right up to the supraorbital margin. The lining mucosa should be disturbed as little as possible; that which lines the dome of the cavity should be left intact. With Citelli forceps the bone in front of the frontonasal duct (that is to say, part of the ascending process of the superior maxilla) is removed. The ethmoid is next attacked, entrance being effected through the lacrimal groove. The ethmoid cells are removed backward, if necessary, to the sphenoid; a new frontonasal duct is then formed further forward than the old one. In order to effect this, an additional portion of the ascending process of the superior maxilla and of the nasal process of the frontal bone is removed with gouge and forceps. A large firm-walled rubber drainage tube pushed up the nose will lie

Fig. 9.

FIGS. 7, 8, and 9 represent complication resulting from infection of the frontal sinus. No. 7, meningitis; No. 8, brain abscess; No. 9, infection of the eye necessitating removal.

well forward, the upper end being tucked into the anterior part of the sinus and the lower end stitched to the ala of the nose. The orbital contents are then allowed to fall back into place and the incision completely closed with fine silkworm-gut. The tube is removed in ten days.

I have operated radically on sixty-five frontal sinuses; included in these are the cases in which more than one operation was performed on the same sinus. Fourteen cases had secondary operations. The failure of the first operation I found to be due to a lack of nasal drainage, or antral disease requiring radical operation. Three had previously been operated on by the intranasal route, and five had radical operations before coming under my care. In one a foreign body was the cause of continued infection; in another multiple bone cysts were encountered, the cysts containing a straw-colored fluid. The first case in the series developed a mucocele three years after the radical operation. Three cases had exposure of the dura from necrosis of the posterior plate; there were no intracranial complications following the operation on these three cases. Three cases were

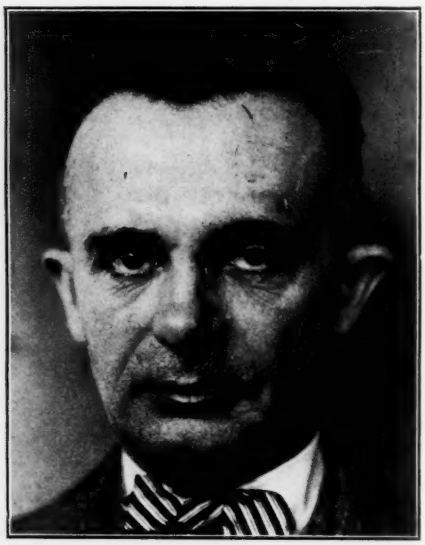

Fig. 10.

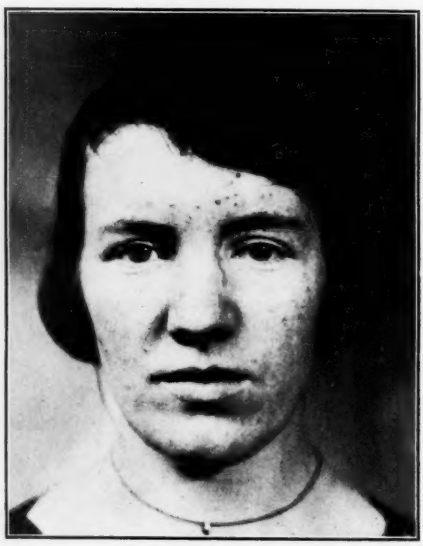

Fig. 11.

Representing cases operated by the Howarth operation with no perceptible deformity.

unnoticed accessory cells, which had not been carefully treated.

There were four deaths: two from multiple brain abscess, and two from meningitis, confirmed by autopsy. One of the cases of brain abscess and one of the cases of meningitis were in a precarious condition at the time of operation. One case of the series required removal of an eye as a result of a secondary infection following the sinus operation. Ten of the cases were operated on bilaterally. All but nine had involvement of ethmoids. Thirteen had sufferers from asthma, two of which were relieved by operation, the remaining one being greatly improved. In three cases the disease was the direct result of an injury, one caused by the kick of a mule, another from a flying piece from a gasoline motor, and another from a direct blow over the sinus. Three of the cases, with bilateral disease, were operated through one side, and all made a very prompt and uninterrupted recovery. When last seen, all of the living cases were entirely free from discharge.

The Use of Radium as a Therapeutic Agent in the Jefferson Medical College Hospital, Philadelphia

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ASSISTED BY
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In the last two years there has been a decided increase in the number of cases treated in the Radium Department of Jefferson Hospital; during 1921 and 1922 there were 245 and 255 new cases respectively, compared with 175 new cases in the previous year. While a great many of these were hopeless, so far as eradication of the disease was concerned, with the use of radium many were afforded unexpected relief. Where large doses of morphia had been given, it was possible to reduce it greatly, and in some cases withdraw it altogether.

By reviewing the accompanying table, it will be found that radium has been applied to almost every part of the body, either for benign or malignant disease, and in those cases in which a special technique was required, the application was made by those having special training along that particular line.

In a previous report from this Department, the flexibility of a radium unit was emphasized; and as our experience grows, this point becomes more apparent. It is not so much the agent that produces the result as how this agent is applied. Therefore it is necessary to have the radium in such a form that it can be made to fit the individual case. Naturally radium emanation is required, and the only efficient method of production is from an emanation plant. While this is troublesome to maintain, its usefulness is certainly rewarded by the results obtained.

It must be understood that no distinct method can be employed in the treatment of all cases and that modifications must be made to suit the individual, yet it has been found that some slight modifications in the apparatus usually employed have given satisfaction and have been of decided value.

The ordinary radium needle has been modified so that the points can be removed; thus if a point becomes dull or bent, it can be replaced by a new one. There are instances where it is not desirable to use a point: as in vascular tissue, or near large blood-vessels. Here a blunt end can be substituted for the point. (See Fig. 1.)

The threading of these points is a most important factor. By placing the female thread in the point and the male end upon the capsule of the body of the needle proper, a degree of strength is afforded to the needle which, when reversed, cannot be obtained. At the same time it will be found that the needle is considerably shortened.

Another small factor that aids in the usefulness of these needles is to have all the

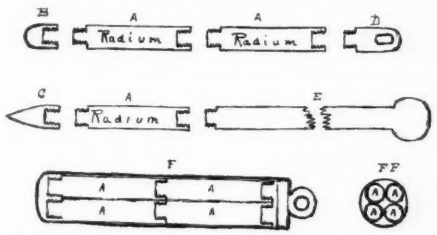

FIG. 1.—Combination applicator and needle for radium. A, capsule containing radium. B, probe end. C, sharp or front end. D, eye. E, long handle. F and F F, fifty or one hundred milligramme capsule for combined use.

threads upon the points, body of the capsules, stems, and eyes the same, and in the same direction. This will permit the employment of several of these tubes screwed together and used in tandem, for the introduction into a sinus or long thin cavity. Where it is desired to use the capsule or the body of the needle alone, both the eye and point can be removed. Under

certain conditions where space is limited, shortening the tube will aid materially.

In cases in which emanation appeared to be necessary, it has been obtained from the American Oncologic Hospital. By employing emanation, it is possible to produce certain reactions that are absolutely impossible by the employment of radium element in capsules. The two principal reasons are: first, the change in relation of the surface treated and the size of the container or the

FIG. 2.—Case No. 601. Epithelioma of the eyelid penetrating the outer edge of the orbit to the depth of 2 cm.

concentration of the dosage to a given area. In other words, a small tube of concentrated radioactive element produces a more intense local effect than a diluted one, contained in a large capsule. Second, where emanation is used in thin glass capsules it is possible to employ more of the B radiation, which, in some instances, is desirable; especially when these tubes are embedded in a tumor or used upon the surface in the treatment of certain skin affections.

The question is often asked in regard to dosage: "What is to be expected from 50 milligrammes or 100 milligrammes of radium or 50 millicuries or 100 millicuries of radium emanation?" Theoretically, they should be the same, modified by their containers and filters. In reality, the effect depends entirely upon the concentration of the radioactive element.

Superficial Cases.—Radium is usually to be preferred to the *x*-ray in the treatment of superficial epitheliomas. While in many instances either will produce a satisfactory result, there is less likelihood of injuring the deeper structures with radium; and in certain areas, as near the ala of the nose and about the eyelids, this factor is an important one.

Case No. 601 illustrates this condition, occurring about the eye in an elderly woman. When first seen the ulcer extended along the lower lid, which was greatly thickened. At the outer corner the ulceration extended for a considerable distance back in the sulcus. Some difficulty was experienced in healing this condition, until small radium emanation seeds were placed directly into the ulcerated area, when healing promptly followed. (See Figs. 2 and 3.)

Where the disease has reached the deeper structures of the face, the healing depends largely upon the possibility of obtaining support for the regenerating tissue; and in those instances where there is extensive bone involvement the prognosis is bad.

If there should be overgrowth of fungoid tissue, it is often desirable to remove it before applying radium by one of several methods. Diathermy or cautery has usually been employed and found satisfactory, as no bleeding follows these procedures, and at the same time there is a sealing of the surfaces. The application of radium can be made without the danger of hemorrhage, and the foul discharge of sloughing tissue is also lessened.

It is always difficult to judge the exact amount of radiation required to produce a certain result. Several cases have come under observation where it appeared an excessive amount had been given, and the reaction that followed was painful, while

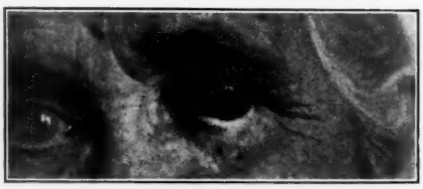

FIG. 3.—Case No. 601. Result after treatment.

healing was delayed. Therefore it has been a rule to try and produce as little reaction as is possible, consistent with the diseased condition. A total of 50 superficial epitheliomas came under observation, and 27 of them still remain free from disease. Epitheliomas occurring upon the lip have not been included among the superficial

cases, the character of the disease being entirely different in its development; therefore the mode of treatment necessarily differs. As routine, about 800 to 1000 milligramme hours are given locally, followed by several series of cross-fire treatments of the neck, to thoroughly radiate the cervical glands; this routine is adopted even in those cases in which the glands are not palpable. A total of 20 lip cases were treated; 12 remain free from disease, 2 were not benefited, 5 disappeared while under treatment, and 1 recurred.

In those cases in which there has been a tendency to the formation of a sinus, as is frequently seen about the ear and vulva, radium can be placed directly within the cavity, and the base receives the same dosage as its opening. At the same time superficial epitheliomas, occurring upon the mucous surfaces of the mouth or vagina, necessarily call for the use of radium.

Case No. 999. Referred by Dr. E. E. Montgomery. A woman of sixty-six years of age, with a nodular growth about the entrance of the vagina, extending upward about one and a half inches to the left side, and forward surrounding the urethra. Needles were placed in the growth upon four separate occasions, about three months apart. The masses disappeared, leaving only a slight thickening, and there is no interference with the urethra.

Female Pelvic Organs.—It would be impossible to review each individual case in the table; therefore only those groups will be cited that appear to be of some special interest. Previous reports have dealt in more or less detail with the employment of radium in various diseases of the female pelvic organs. The present status for the employment of radium in these diseases remains unchanged, except in the last two years *x*-ray has been used in cases of small fibroids and uterine bleeding from benign causes. It has been found that very small doses of *x*-ray will give the desired result in less time, and this saves the patient the unpleasant manipulation necessary for the placing of the radium. The results are uniformly good, especially in those about the time of the menopause.

It will be noted in the tabulated report there are 53 cases in the column of results unknown. These were treated in other departments and the results could not be followed. Special reports have been made of them.

Rectal Cases.—An interesting number of cases, with disease occurring in the bowel, were observed and may be divided into three groups. First, the late cases, absolutely hopeless, due to their physical condition; second, the class in which operation had been performed for the complete or partial eradication of the disease; and third, the favorable cases in which the disease had not made inroads on the physical condition enough to impair its well-being.

Even in the late cases temporary improvement, lasting several months, is often obtained. The improvement consists in the relief of pain with a checking of hemorrhage and lessening of the discharges of pus and débris. With some healing of the local ulceration, the disease usually breaks out again in other localities and toward the end the decline is rapid.

In the second class several cases, in which a Crasky operation had been performed, were referred with slight recurrences at the site of operation. In two the disease has entirely disappeared and the patients are still in apparently good health. Cases No. 635 and 859 were referred by Dr. Shallow. In the first, eight applications were given, extending over a period of one year, both locally in the remaining pouch in the rectum and also cross-fire from without; in the second case eight treatments were given, extending over a period of one year, both locally and by cross-fire.

In the third class temporary results are obtained, as lessening of the pain and discomfort incident to the ulceration of the bowel, and lessening of the size of the mass. The usual period of relief is from about one to three years. Two of these cases have reported with no recurrence six and

seven years after treatment. An unpleasant feature in those where the disease has disappeared is the firm stricture that follows at the site of old ulceration; cases Nos. 625 and 835 are examples. The failure to obtain results about the sigmoid and in the higher portion of the colon, as well as in the small bowel, has been probably due to imperfect technique.

Tongue Cases.—The table shows that twelve tongue cases were treated. The majority of them suffered from more or less involvement of the surrounding structures, and the glands of the neck were enlarged. But enlarged glands in the neck must not necessarily be regarded as malignant, as in several instances they have disappeared spontaneously, after the disappearance of the disease from the original site. They evidently enlarged from pyogenic infection and were not malignant. The ulcers were usually treated by burying needles or a tube of radium or radium emanation of about the value of 100 milli-

FIG. 4.—Case No. 339. Shows scar on the right side of the tongue. No evidence of disease.

grammes in the tongue, for six to twelve hours. In some cases the radium was applied by placing it upon a wooden tongue depressor, or a mold of dental wax, which held it over the diseased area for the required time. The submaxillary space and neck were always radiated thoroughly to check the possibility of secondary glandular involvement. In those instances where there is marked glandular involvement, growth may be retarded, but absolute recession is usually doubtful.

Case No. 339 (Fig. 4), referred by Dr. Gibbon, is of greatest interest, due to the locality of the disease. The ulceration, situated on the posterior edge of the tongue, was 2x3 cm. in diameter, with a number of glands enlarged in right neck. The result was good and is shown in the illustration. Two other cases still remain free from disease, and one other was improved when last observed. Six disappeared while under treatment, while two were not benefited.

Oral Cases.—It is of unusual interest to notice that the great majority of all these cases of malignant disease in or about the oral cavity occur in "dirty mouths," where there has been a neglect of ordinary cleanliness over a long period. In some there has been an effort to cover dental defects with various forms of artificial substitutes, and it will always be observed that the teeth are in bad condition. The disease in these cases usually begins upon the mucous membrane as a small ulceration and extends rapidly. It will be found that the underlying tissues are infiltrated to a greater degree than would be supposed by casual inspection. Glandular involvement of the neck appears early. These cases are not to be confused with those cases beginning as a leucoplakia, in which the progress of the disease is always slower and more amenable to treatment.

Malignant disease developing in the pharynx or nasopharynx is usually rapid in its course, and it is impossible to adopt any routine form of treatment, due chiefly to the great difficulty of applying radium in sufficient dosage, without causing injury to other underlying important structures, such as large blood-vessels, nerves, the bone, and even the brain. Of 28 cases that came under observation, 10 remain free from disease.

Cases occurring upon the neck, usually in and about the angle of the jaw, where the glands become involved early, show a marked degree of malignancy; and while

not difficult to treat, the control of the disease is often impossible. Case No. 713, referred by Dr. Vaughn, illustrates its refractory nature. The disease was supposed to have started from an abscessed tooth. A mass developed in right neck, directly below the angle of the jaw, and at the time treatment began there was an ulcer 3½ x 3

Fig. 5.—Case No. 713. Carcinoma involving the deep structure of the neck under the angle of the jaw. No involvement of pharynx or larynx could be found.

cm. in diameter. The mass was treated by direct, cross-fire radiation. It produced a severe superficial reaction, but complete absorption of the mass resulted, as shown in the illustration.

Carcinoma of the Larynx.—A number of cases of carcinoma of the larynx were referred by Dr. Chevalier Jackson for treatment; and while several methods were employed, it was found that the cross-fire of the neck gave the best results. It would seem to possess several advantages over some of the more radical methods. First, it does not produce the severe degree of trauma that necessarily follows when needles are introduced directly into the diseased area. Even when the radium is introduced into the larynx, the greatest amount of reaction must necessarily be upon the inner surface, and this is not desirable. In the cases in which radium fails, it only adds considerable unnecessary discomfort. The points in favor of the cross-fire method are its ease of application, its painlessness, and the fact that the active part of the disease, the base, receives the most intensive treatment.

The cross-fire method must not be used in a haphazard way by simply placing the radium at any spot on the neck. It must be planned carefully in conjunction with a laryngologist, who can give the exact condition and location of the lesion. The cross-fire method has also been used in carcinoma of the larynx, as prophylactic. In these cases very mild radiation has been given and not pushed to the same degree as for those cases in which the disease is to be destroyed by radiation.

Carcinoma of Penis.—One referred case showed involvement of bladder and inguinal glands. Several operations were performed on this patient, and while the disease was held in abeyance, the condition of the man was not favorable, due to his extremely heavy weight. In healing, the natural urinary passages were closed and urine flowed from the abdominal wound. Large sinuses developed in right and left groin. Death resulted about twenty-two months after employment of radium, and was due to pyemia rather than to the local disease.

The second case was a favorable one for radium treatment, and was improving, but was influenced to use some patent caustic paste. The result was most unsatisfactory.

Most of the prostatic and bladder cases were treated in the Genito-urinary Depart-

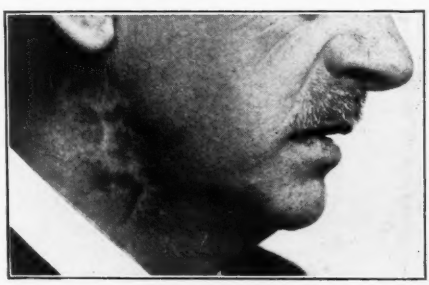

Fig. 6.—Case No. 713. Shows result of treatment. See text.

ment and special report has been made of them elsewhere. In this report they have been listed in the column of results unknown, the total being 26.

Sarcoma.—It is extremely difficult to interpret the value of radium in sarcoma. In cases in which good results have been obtained, one must be extremely circumspect

in making deductions as to the amount of benefit received from the method employed. Attention is again called to the fact that a small tumor, supposed to be an enlarged gland, which, when radiated, entirely disappears, is very likely to be a sarcoma and will at times recur at some unexpected, distant part. The recurrence may be so rapid and at so many widely different parts as to cause a fatal issue.

Sarcoma occurring in young children appears to be more malignant than in the adult.

The irregularity in the manner of growth of the tumor, its tendency to remain quiescent at its original site and to take on a new growth at some distant point, either spontaneously or under the influence of some form of treatment, must also be fully considered. Case No. 642, referred by Dr. Hustead, illustrates an instance where the local influence of radium was all that could be expected. This woman had an enormous sarcoma of right thigh, which measured 25 inches in circumference when she came under observation, and ten months later a mass developed in the right breast.

FIG. 7.—Case No. 728. Notice the tumor anterior and below ear.

These were treated and greatly reduced in size. Six months later she developed a mass on the left shoulder; at the same time a mass was found in the abdomen and also upon right side of the back. These masses were treated, and while they decreased in size others developed. Finally one developed in the spine; pressure symptoms resulted; and associated with absorptive products of these degenerating masses, the woman's decline was rapid.

Case No. 607, referred by Dr. Speese,

FIG. 8.—Case No. 728. See text. Result after treatment.

and No. 1023, referred by Dr. Manges, two cases of sarcoma upon the chest wall, recurring after operation, have both been treated by inserting needles directly into the mass, followed by cross-fire radiation. They are still under observation and the disease has not recurred. Of 65 cases classed as sarcoma, 17 were improved and remain free from disease.

Benign Cases.—From results obtained in benign cases, those of most interest were the deep cavernous nevi. Of all the methods proposed for these unfortunates, radium appears to offer the best results. A perfect skin cannot be placed where it never existed, and in general the mass is replaced by scar tissue and will act as scar tissue. It will not be as resistant as normal skin, and is more easily injured. Greater care will be needed to protect it, and those interested should also be made to realize that these tumor masses often undergo spontaneous ulceration from unknown causes, and are very likely to ulcerate while being treated by radium. Ulceration should be

avoided, if possible, as the resulting scar is always irregular and thickened.

Case No. 728 (Figs. 7 and 8), referred by Dr. Shaffer, showed a rather unusual type of hemangioma, where the dilated veins formed a tumor mass about 4 cm. in diameter and 1½ cm. in elevation, directly below the ear. Over it were a few small areas where the skin had been displaced with veins. This mass was entirely removed, and the only effect upon the skin was a slight pigmentation about those areas containing the surface veins.

Case No. 789 illustrates a class where there is a large tumor mass covered by skin, which has not been involved. By inserting the radium directly into the mass it is possible to destroy it without damage to the overlying skin, as shown in Figs. 9 and 10.

Two women, suffering from angiomata of the cavernous type upon the tongue, were successfully treated. In both instances the disease had existed for many years and had caused no trouble. Both tumors had developed new growth and had become annoying, in that they were likely to be injured during the mastication of food. One gave considerable trouble on several occa-

FIG. 9.—Case No. 789. Large hemangioma of upper lip.

sions from hemorrhage, which was difficult to control.

Another mouth case treated nine years ago, a young girl suffering from an angioma of the left side of the tongue, was seen recently, and the mouth now presents a normal condition.

It is impossible to give a detailed account of the technique used in the treatment of these angioma cases. The dosage must be governed by the results to be obtained, and as it is vascular tissue we are dealing with, allowance must be made for its irregularity and distention, under peculiar circumstances.

A total of 39 hemangioma cases were

FIG. 10.—Case No. 789. Shows result. See text.

treated; 24 were markedly improved, 5 still remain under treatment, 10 others left while under treatment.

The pigmented angiomas totaled 6. Of these 3 were improved and 3 left while under treatment. In the class lymphangiomas, 4 cases were under observation, 2 improved, one still remains under treatment, and in one the result is unknown.

Several patients suffering from keloids have been treated, and where they have persisted in treatment the hard, fibrous tissue has been entirely removed. As the success of the treatment depends upon time, which will often be eighteen months or two years, many become careless and neglect the proper interval between each application, which necessarily vitiates the result.

In closing, we wish to express our thanks to those who have assisted the Department in its work: Dr. Crawford, of the Pathological Department, for his great assistance in submitting his careful reports; also to Miss Sheafer for her care in her work; and, above all, to our generous donor, Mrs. Lucy B. Henderson, whose assistance made our work possible.

Carcinoma and Epithelioma.	Improved.	Unimproved.	Result not known or not treated with radium.	Under treatment.	Total.
Bladder	2	1	9	0	12*
Breast	11	2	5	3	21
Breast and lungs	0	1	0	0	1
Cervix uterus	4	4	29	2	39*
Chest	0	0	1	0	1
Cheek	6	2	2	1	11
Duodenum	0	1	0	0	1
Ear	3	1	1	0	5
Epiglottis	0	0	1	0	1
Eyelid	2	0	0	2	4**
Face	2	0	4	0	6**
Face and hands	1	0	0	0	1**
Finger	0	0	1	0	1
Forehead	4	1	1	0	6**
Groin	1	0	1	0	2
Hand	0	0	1	0	1
Jaw	3	1	3	1	8
Kidney	1	0	0	0	1
Labia	0	0	1	0	1
Larynx	4	7	5	2	18**
Lip	12	2	5	1	20**
Liver	1	2	0	0	3
Mouth	9	5	5	1	20
Neck	0	3	3	2	8
Nose	8	0	3	2	13
Esophagus	2	2	3	0	7
Ovary	0	0	2	0	2
Palate	0	1	1	0	2**
Parotid	1	0	2	0	3
Penis	0	0	2	0	2**
Pharynx	1	3	0	1	5**
Prostate	0	2	16	0	18*
Rectum	7	5	9	2	23**
Scalp	0	0	1	0	1
Scrotum	0	0	1	0	1
Shoulder	0	0	1	0	1
Sigmoid	0	0	1	0	1
Stomach	0	1	0	0	1
Temple	1	1	0	0	2
Thyroid	0	0	1	0	1
Tongue	4	2	6	0	12**
Tongue and neck	0	1	0	0	1**
Tonsil	0	1	0	0	1
Trachea	1	0	0	0	1
Urethra	1	0	0	0	1
Uterus	3	5	18	0	26*
Vagina	3	0	5	0	8*
Wrist	2	0	0	0	2
*Sarcoma.***					
Abdomen	0	0	1	0	1
Arm and chest	0	0	1	1	2
Chest	2	1	2	0	5
Elbow	0	1	0	0	1
Face	0	0	1	0	1
Finger	1	0	0	0	1
Foot	1	0	0	0	1
Hip	1	4	0	0	5
Knee	0	0	1	0	1
Leg	1	1	0	0	2
Maxilla	0	1	0	0	1
Neck	1	4	3	0	8
Orbit	0	3	0	0	3
Pelvis	0	1	0	0	1
Sacrum	0	1	0	0	1
Shoulder	0	0	2	0	2
Sinus—lateral	0	0	0	1	1
Thigh	1	3	2	3	9
Tibia	1	0	0	0	1
Thumb	0	0	1	0	1
Thyroid	0	0	1	0	1
Tongue	2	0	0	0	2
Endothelioma:					
Jaw	0	1	0	0	1
Parotid	1	0	0	0	1
Lymphosarcoma, neck	1	3	1	0	5
Osteochondroma, humerus	1	0	0	0	1
Parotid tumor	1	0	1	0	2
Tumor of head	0	0	1	0	1
*Unclassified Non-malignant Hemangioma.***					
Arm	1	0	1	0	2
Arm, neck and breast	1	0	0	0	1
Back	1	0	0	0	1
Cheek	3	0	2	1	6
Chin	1	0	0	0	1
Ear	1	0	0	0	1
Eyelid	0	0	1	0	1
Face	1	0	2	0	3
Forehead	3	0	0	0	3
Hand	2	0	0	1	3
Knee	1	0	0	0	1
Leg and abdomen	0	0	1	0	1
Lip	5	0	1	0	6
Neck	1	0	1	0	2
Nose	0	0	0	2	2
Temple	0	0	1	0	1
Thumb	1	0	0	0	1
Tongue	2	0	0	0	2
Wrist	0	0	0	1	1
Lymphangioma:					
Cheek	1	0	0	1	2
Hand	1	0	1	0	2
Pigmented angioma:					
Cheek	1	0	0	0	1
Back	0	0	1	0	1
Face	0	0	1	0	1
Lip	1	0	0	0	1
Nose	1	0	0	0	1
Neck	0	0	1	0	1
Keloid:					
Arm	1	0	0	0	1
Abdomen and breast	0	0	1	0	1
Breast	0	0	1	0	1
Chest	0	0	1	0	1
Ears	1	0	0	0	1
Face	1	0	1	0	2
Hand	0	0	1	0	1
Head	0	0	1	0	1
Neck	1	0	0	0	1
Shoulder and arms	1	0	0	1	2
Sternum	1	0	0	0	1
Chondroma, hand	0	1	0	0	1
Epulis	2	0	0	0	2

Papilloma.	Improved.	Unimproved.	Result not known or not treated with radium.	Under treatment.	Total.
Ear	0	0	1	0	1
Larynx	1	0	2	0	3
Nose	0	0	1	0	1
Palate	1	0	0	0	1
Tongue	1	0	0	0	1
Parotid tumor	1	0	0	2	3
Myxochondroma, jaw	1	0	0	0	1
Osteochondroma, leg	1	0	0	0	1
Ramula, tongue	0	1	0	0	1
Adenomatous goitre	0	0	1	0	1
Adamantoma, jaw	1	0	0	0	1
Desnoid of abdomen	0	0	1	0	1
Granuloma of eye	0	0	1	0	1
Tumor:					
Tongue	0	0	1	0	1
Wrist	0	0	1	0	1
Keratosis:					
Nose	0	0	1	0	1
Ear	0	0	1	0	1
Leukoplakia	1	0	3	1	5
Hyperthyroidism	5	0	1	0	6
Leukemia:					
Lymphatic	1	1	0	0	2
Myelogenous	2	2	1	0	5
Enlarged spleen	1	0	1	0	2
Chronic ulcer:					
Ear	1	0	0	0	1
Foot	1	0	1	0	2
Leg	0	0	1	0	1
Spring catarrh, eyes	1	0	0	0	1
T. B. glands	0	0	1	0	1
T. B. larynx	0	1	0	0	1
Mastitis	0	0	0	1	1
Lupus of ankle	0	1	0	0	1
Lupus vulgaris	0	0	1	1	2
Chr. cystic oöphoritis	1	0	0	0	1
Trachoma	0	0	1	0	1
Polyp, cervix	0	0	1	0	1
Varicose veins	0	0	1	0	1
Adenomyoma, uterus	0	0	1	0	1
Fibroid uterus	4	0	21	0	25*
Myoma, uterus	0	0	5	0	5*
Menorrhagia	2	0	10	0	12*
Metritis	0	0	6	0	6*
Chr. endocervicitis	0	0	1	0	1*
Total	177	88	258	37	560

*Treated in other departments; results reported elsewhere.
**See text.

Treatment of Atrophic Rhinitis

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Atrophic rhinitis as a disease entity may be the result of widely differing etiologic factors, some of which are frequently lost sight of in the slow development of the malady. The results of therapy are therefore likely to be disappointing unless one is sufficiently painstaking to search into the possibilities for definite etiologic factors.

Broadly speaking there are three general groups of cases:

1. Constitutional.
2. Occupational.
3. Chronic sinusitis.

(I omit the bacteriologic cause for the reason that despite the great amount of work done by Hofer, Kofler, and others, neither the Perez nor the Abel bacillus has been definitely proven to be specific.)

Under the first group we must consider those cases occurring in the poorly nourished young adult whose diet is deficient in essential vitamins and whose personal hygiene and habits are at fault. Cases of this type when put on cod-liver oil, given the proper diet, ordered to bathe frequently, take exercise in the open air, etc., are immensely benefited from the start and may overcome the disease before the atrophic changes have become irremediable. Obviously if one overlooks these factors and attempts to treat the patient entirely by local measures, he will be doomed to disappointment and failure.

The second group comprises those individuals who are employed in surroundings which compel them to inhale toxic or irri-

tating particles. We find a large number of such patients among woolen workers and tailors. The inhalation of fine particles of dyed wool has a most pernicious effect on the nasal mucosa, and these patients give a most astonishing picture of chronic rhinitis with very frequent acute exacerbations. We also have seen many such cases among pressers who stand all day over a steam press inhaling the fume-laden steam which ascends from the wet cloth.

This type of case can never be cured unless the patient changes his occupation. The influence of the occupation can readily be determined by inquiring of the patient as to whether or not he feels better on a Sunday or a holiday. The answer is always in the affirmative.

The third class of cases are those suffering from a chronic sinus infection. These are not so easy to determine inasmuch as the *x*-ray picture frequently fails to localize the disease to a definite group of cells or sinus, and also because repeated examinations may fail to demonstrate the particular source of the discharge. Frequently it is only after repeated cleansing of the nasal cavities that one is enabled to see the secretion coming from a sinus aperture and later to confirm the knowledge by succeeding examinations. The importance of a definite diagnosis can readily be appreciated by the fact that any operative procedures in these cases, unless directed at the exact source of infection, must inevitably result in aggravating the symptoms, in some cases beyond the possibility of permanent cure.

Having removed the cause we are next concerned with the problem of restoring as far as possible the mucosa to its normal function. The success of this will, of course, depend upon the degree of atrophy to which the mucosa and underlying bone have progressed. In principle the treatment divides itself into three elements:

1. Cleansing.
2. Protecting.
3. Stimulating.

By cleansing we refer to the use of nasal douches for the purpose of removing the thickened secretion or scabs. This is accomplished by irrigating the nasal cavities with a weak alkaline solution run into the nose under low pressure, the patient's head being bent forward and the respiration carried in through the mouth. The irrigation will loosen the masses so that that they are easily expelled without injury to the mucosa or danger to the ears. This is followed by spraying the nose thoroughly with a bland oil such as liquid petrolatum. I do not approve of the essential oils in these cases except in very low percentage. The oily spray affords protection to the mucosa and clings long enough to prevent the adherence of the altered mucus.

The stimulating treatment consists of the use of such remedies as will promote glandular activity and improve the nutrition of the intranasal tissues. For this purpose we have found the application of scarlet red emulsion (P., D. & Co.) extremely efficacious. This preparation is rubbed into the accessible nasal mucosa by means of a cotton-wrapped metal probe after thorough cleansing of the cavities. The application must be painstaking and thorough, so that the medicament is actually rubbed into the mucosa. It does not necessarily involve the use of great force; in fact, too much pressure is undesirable, but the application must be firm and persistent. We have found that the patient will show traces of the red color in the mucus as late as five days after a treatment.

The beneficial results manifest themselves in a marked diminution of the crusting, the nasal discharge becoming more fluid and easily expelled and the odor gradually disappearing. Applications of the emulsion should be made at five-day intervals, while the cleansing treatment is continued once or twice a day at home. As the condition improves the intervals may be lengthened.

Operative procedures directed at narrowing the nasal meati by the implantation of cartilage into the septum, the forcible approximation of the naso-antral walls, etc., all have their advocates who claim a certain measure of success. We hesitate to

recommend them, partly because the ultimate results have as yet to be published, and mainly because these operations are aimed at bulwarking the bony supports and fail to consider the mucosa itself, which must be regenerated before it can assume its normal function.

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The Treatment of Bichloride of Mercury Poisoning[1]

BY JOSEPH C. DOANE, M.D.

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The justification for the presentation of this paper does not lie either in the speaker's ability to present startling statistics as to recovery in mercury poisoning, or in any real or supposed innovations in treatment. I am, however, of the opinion that present-day clinicians are sometimes too strongly impressed with the prognostic hopelessness of these patients, and that this mental attitude does not reflect favorably on either the promptness, planning, or persistence of treatment. I will touch in detail only on those types of treatment with which I have had experience, and merely mention, for the sake of completeness, the use of certain other therapeutic measures of more or less proven specific chemical action.

At the outset, brief mention should be made of certain basic and usually well-known facts, relative to the absorption and elimination of mercury from the body, since they have a very definite bearing on the successful prosecution of any type of treatment. Especial attention is invited to two important considerations in this relation—that the gastric mucosa has been proven by Lieb, Goodwin, Wellander, and others, to be actively concerned in eliminating mercury, and that the mucous membrane of the colon and upper rectum is also very active in excreting this drug. Flexner and Sweet have demonstrated that mercury absorbed by the gastrointestinal tract is taken up by the liver, secreted by the bile, and then reabsorbed by the intestines.

The renal tubular mucous membrane appears to possess a specific affinity for this poison, for here we see a necrosis which appears to be out of proportion to the damage done to other bodily tissues, which are brought in contact with blood containing mercury in no less concentration. The damage to the renal tubules is, therefore, probably not largely done by the mercury-laden urine, but is a part of general tissue damage done by a blood stream richly supplied with this poison. This fact appears to be of therapeutic importance, because even when no mercury is found in the urine, if the blood is from time to time receiving this drug from some tissue where it has been stored, the kidney damage is still taking place.

There are two great classes of cases of bichloride poisoning—those which actually swallowed the drug, and those which did not. This statement appears to smack of triviality, until it is explained that without any intention of deceit not a few of the latter type creep into statistical studies as cured cases. We have recently observed a patient who came to the hospital stating she had swallowed a number of bichloride tablets. No mercury was discovered in the vomitus, urine, or stools, although the patient was strenuously treated because of the fear of overlooking a therapeutic need. Before she left the hospital it was learned that the tablets—the nature of which was not determined—were dissolved in milk before taking, and that the motive ap-

[1]Read before the College of Physicians of Philadelphia.

peared to be to bring an erring colored spouse to leash, and thus discourage his attentions to other ladies of color in the vicinity. Waving our hand at such a patient would have filled the same need as did our diuresis and colonic irrigation. Let it be said, however, in passing that it is far wiser to actively treat ten such cases, which later are found not to be in need of such care, than to delay one hour waiting for confirmatory symptoms to develop.

The failure to detect mercury in the stomach and intestinal contents, and the absence of the metal in the urine, are the only certain criteria by which the need for treatment can be judged, and until the laboratory has furnished this data the case should be adjudged one of real mercury poisoning.

Prior to the last decade the treatment of acute mercurial poisoning had fallen into a state of hopelessness, which served to discourage any thorough scientific search for the means of saving even a meager proportion of these patients.

In 1913, Linhart suggested that sodium phosphite, in conjunction with sodium acetate, had the property of reducing mercuric chloride *in vitro* to the harmless calomel. Carter clinically developed this idea in 1914, and gave to this antidote his name, by which it has since been known.

These experiments stimulated others to endeavor to neutralize or, at least, to render this poison innocuous, and as a result of the work of Lambert and Patterson, Wilms, Rosenbloom, Fantus and Hyatt, Weiss, and others, much has been learned about the pathology, symptomatology and treatment of poisoning by this drug.

There are several important considerations which apply to all types of treatment of acute mercurial poisoning:

1. Most patients who have absorbed the lethal dose of mercuric chloride will die in from four to seven days.

2. No treatment can promise as much as can one which depends largely on actual removal of the poison before absorption.

3. Some patients will die who are promptly treated by the most modern methods.

4. Not a few patients can be saved by the prompt adoption of newer principles of treatment.

5. The treatment now used by many physicians is casual, lacking in system, not vigorously pushed, and usually productive of a much too high mortality.

Sansum states, if four milligrammes of mercury per kilo of body weight has gained access into the extra-portal circulation, that there are no grounds for believing that any treatment will save life. If this be true, no further argument is required to justify either the greatest speed in preventing absorption, or the existence of an honest disbelief in some too brilliant results of treatment which appear in the medical literature.

The early administration of an albuminous substance is, of course, of prime importance, the stomach mucous membrane being at once thoroughly cleansed, to remove the mercuric albuminate thus formed. A portion of the stomach contents should, of course, be saved for examination for mercury, to establish the need for treatment.

Fantus has shown, as a result of careful and exhaustive animal experiments, that for this purpose egg-albumen is much more efficient than is milk. Indeed, this observer states that although one thousand parts of milk will remove one part of mercury from solution, yet when mercury, in this solution, is fed to rabbits, these animals lived no longer than if water had been used as a diluent. The only difference observed was an absence of local corrosive lesions when milk was used.

Fantus suggests, as a result of his experiments, the use of milk as a vehicle when mercury is to be given by mouth, since it minimizes the local effect of mercury on the stomach, without interfering with its systemic action. Due to the promptness with which Hg is absorbed, unless administered with the mercury, or almost immediately thereafter, no exogenous albumen is able to break the bond of saturation which exists between the drug and the tissue albumens. The greatest good, therefore, comes from the lavage and not the albumen.

The emergency measures having been carried out, the physician must now determine the type of routine which is to be followed for the next seven to twenty-one days, for this part of the treatment must of necessity be more or less prolonged. The physician has the following types of treatment from which to choose:

1. The alkaline eliminative treatment, suggested by Lambert and Patterson.
2. The calcium sulphide treatment.
3. The sodium phosphite treatment, advised by Linhart and Carter (Carter's antidote).
4. The sodium hypophosphite treatment, urged by Fantus and Rosenbloom.
5. A combination of the most promising features of the above, which may also include certain surgical procedures, such as renal decapsulation, cecostomy, or appendicostomy.

The alkaline eliminative treatment seems to be especially useful, for not only has it been as efficacious as any, but also because it requires no equipment in drugs or personnel which the average clinician will not usually find at hand. It can also be used as a basic routine, to which may be added the administration of any or all of the special drugs mentioned above. This routine is as follows:

When vomiting has ceased, an alkaline mixture is administered, which serves to combat acidosis, as well as dilute the poison in the blood stream, and thus to some extent spare the kidney. The well-known Imperial Drink is as useful as any. Eight ounces of this mixture should be given every two hours, alternating with eight ounces of milk. A solution of potassium acetate—one drachm to the pint—should be given by bowel, by the drip method, continuously day and night.

Since mercury is actively eliminated by the colonic mucous membrane, the lower bowel should be copiously flushed twice daily, until the washings no longer return a positive test for mercury. For the same reason the stomach should be washed twice daily with a five-per-cent sodium bicarbonate solution, or with warm water. A hot pack should be given daily. I have cautiously used, with good results, pilocarpine, grain 1/8, by hypodermic injection at the beginning of the pack, to promote sweating. This drug is especially useful late in the treatment, when the sweat glands seem to be too fatigued to respond to the usual physical measures.

This treatment should be continued from one to three weeks, dependent on the chemical examination of the body fluids and the functioning of the kidneys.

The use of calcium sulphide was first suggested by Haywood and Allyn in 1913, but was later clinically developed by Wilms and Holm. It is based on the fact that when mercuric chloride and calcium sulphide are brought together in a test-tube, an inert substance—mercuric sulphide—is almost immediately formed.

$$Ca.S.+Hg.Cl_2=Ca.Cl_2+Hg.S.$$

In the test-tube one grain of calcium sulphide will render four grains of mercuric chloride inert, but it is customary, for every grain of mercuric chloride taken, to administer intravenously one grain of fresh calcium sulphide in one ounce of sterile water. Calcium sulphide is not very soluble in cold water, one grain barely dissolving in one ounce of water. To obviate this difficulty the drug is added to sterile water, and then the solution is boiled, cooled, and filtered through cotton, and placed in a tightly stoppered bottle, ready for use.

Wilms cautions that the calcium sulphide should be fresh, since deteriorated preparations are toxic, due to the harmful action of the calcium radical on nerve tissue. Hydrogen sulphide is also found in old solutions.

Solutions of one grain to the ounce of water may be used as a medium for lavage, and two to five grains, every two hours, may be given per oram, until the odor of suphuretted hydrogen is detected on the patient's breath.

During the past ten years it has been

my privilege to observe a considerable number of bichloride poisonings, and I have been impressed by the lack of sustained effort in their treatment. Recently, four patients, suffering as a result of poisoning with mercuric chloride, have come under the writer's observation. A very brief review of two of these cases may serve to illustrate the nature of the treatment given:

Case 1.—E. K., female, thirty-four years old, was seen by the writer twelve hours after swallowing four mercuric chloride tablets, dissolved in six ounces of water. One hour after poisoning the whites of four eggs were given, followed by a very copious gastric lavage—several gallons of warm water being used for this purpose. A saline purge was also administered.

Analysis of the gastric contents, obtained by lavage, showed large quantities of mercury. The urine contained Hg., albumen, hyaline and granular casts, a few red-blood cells, and many white cells. Her blood-pressure was 110-65. A laryngologist, who was requested to examine the larynx and pharynx, reported an acute inflammation of both, but no edema. There was no salivation or gingivitis observed at any time. The physical examination disclosed nothing unusual, except a bilateral apical tuberculosis (with which this patient was suffering), a remorseful mental state, and a moderately distended and tender abdomen. The patient voided eight ounces of urine during the first twenty-four hours. On the second day the temperature was elevated to 103°, and the urea nitrogen to 36 milligrammes per 100 cc. The blood-pressure was 125-60. The dysphagia had about disappeared. The patient voided twenty-seven ounces of urine during the day. On the third day, or about eighty-five hours after poisoning, the patient stated that she felt better, had no complaints, and asked for solid food. Her urinary output was twenty-eight and one-half ounces, her blood urea 42, and her blood-pressure was now 132-72. This apparent well-being from the third to the seventh or eighth day is often but a medical mirage, which usually leads to false hopes of recovery, and frequently causes a relinquishment in the strenuous prosecution of treatment.

On the fourth day the patient voided thirty-five ounces of urine; her blood-pressure was 130-66, and her blood urea 23.

On the fifth day twenty-four ounces of urine were excreted, and as yet no alarming symptoms had appeared, save a light somnolence, from which the patient could be easily aroused. Her plasma CO_2 was now 57 per cent, her blood urea 22, and her phenolsulphonephthalein elimination was 32 per cent. On the sixth day the urinary output had dropped to eighteen ounces, and her urea nitrogen was now 35 milligrammes per 100 cc. Surgical consultation was sought as to the advisability of decapsulation of the kidneys. This was not deemed best at that time. The somnolence had deepened, and the urine was heavily loaded with casts, albumen, and red-blood cells.

On the seventh day after poisoning but six and one-half ounces of urine were excreted. The patient was somewhat stuporous, but could be easily aroused. On the eighth day four ounces of urine were voided, this being secured only after catheterization. The eye-ground examination was negative. The blood urea nitrogen was 73, and creatinin was 3.1. The stupor gradually deepened on the ninth and tenth days, there being four and one-quarter and three ounces of urine voided, respectively. There was a slight twitching of the facial muscles, the stupor deepened, and dissolution took place on the morning of the eleventh day.

The alkaline eliminative treatment was used in this case, together with the administration of calcium sulphide. Due to difficulty in entering a vein, but seventeen grains of calcium sulphide could be given in this manner, so that three grains of this drug were administered per oram, every third hour for three days.

Whether the delay in instituting both the emergency and routine measures was the deciding factor in determining the unfavorable outcome, or whether the pulmonary

infection was preponderant, is debatable. Post-mortem examination disclosed a caseation, with cavitation of a large portion of the upper lobes of both lungs; kidneys, the seat of an acute inflammatory process, with lax capsules, and a marked evidence of pseudo-membranous colitis.

Case 2.—In the second case the outcome was more fortunate. This patient—an Italian woman of twenty-nine years—took seven and one-half grains of bichloride of mercury in mistake for aspirin. In ten minutes milk and the whites of eight eggs were administered by the husband, the patient vomiting soon after. On arrival at the hospital, one hour after poisoning, the stomach was washed with warm milk, and seven grains of calcium sulphide, in seven ounces of water, was administered intravenously. A simple enema was at once given, followed by a copious colonic irrigation. Proctoclysis of potassium acetate solution, one drachm to the pint, was begun at once. The patient was given eight ounces of "imperial drink," alternating with a like quantity of milk, hourly. The stomach and colon were washed twice a day, and the enteroclysis was continued without interruption. A hot pack was given once a day. The average daily intake per oram was one hundred and twenty-five ounces, and the urinary output varied from fifty to seventy-five ounces. The initial vomitus was heavily loaded with mercury. The feces returned a positive test for mercury on the second and third days, respectively, after poisoning; and the urine was positive three days after the mercury was taken, and was heavily loaded with casts and albumen.

This patient's recovery was uneventful, and she was discharged after a stay of thirteen days in the hospital.

The third patient's history was very similar to Case 1, death taking place on the thirteenth day after poisoning. The administration of calcium sulphide was delayed in this patient's case, however, three days.

A fourth patient, alluded to above, gave a very definite history of taking the poison, and was very energetically treated, but repeated chemical analyses of urine, feces, and vomitus failed to reveal the presence of mercury, so that she cannot be considered as a true case of mercury toxicosis.

I have had no experience with the other types of treatment mentioned above, and therefore no personal opinion can be expressed, although Fantus, Rosenbloom and others recommend Carter's antidote, and in its absence the hypophosphite of soda, combined with hydrogen peroxide.

Too much stress cannot be laid on the necessity of the early establishment of a routine which is religiously observed day and night, until a clinical and chemical cure is obtained. The frequent cleansing of the stomach and colon is also of prime importance.

It would appear that the combination of a specific chemical, given intravenously, with the administration of large quantities of some alkaline diuretic solution, offers the best hope for recovery. Of course, if the neutralization of a toxic drug, which has gained entrance to the blood stream, was of test-tube simplicity, none need die of mercury poisoning; for I am convinced that if the calcium sulphide could be brought into intimate contact with the bichloride of mercury in the body tissues, the result would always be a fortunate one. Wilms reports recoveries of patients who received the sulphide of calcium by mouth twelve hours, and by vein thirty hours, after the ingestion of mercury.

Of the several surgical procedures which have been suggested, but little can be said in their favor. This is no doubt partially explained by the fact that renal decapsulation is usually deferred until nothing but a miracle could save life.

I have long wanted to observe the result obtained by an early stripping of the kidney capsule before any evidence of nitrogenous retention was observed.

Anderson and Harrold have irrigated the colon through a cecostomy wound in bichloride poisoning. Transfusion of blood has yet to prove itself a useful measure.

It is probable, except under the most favorable circumstances, that whatever type of treatment in mercury poisoning is adopted, hospitalization is indicated, from the standpoint of access both to adequate laboratory facilities and to competent nursing service.

Finally, that treatment is best which does not with unquestioning faith trust favorable chemical reactions, but which with zeal and intelligence eliminates, neutralizes, and, above all else, actually removes the poison from the system before absorption has taken place.

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THIRTY-FOURTH AND PINE STREETS.

Instruction of Tuberculous Patients[1]

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Many new patients and their friends arrive at the Sanatorium with peculiar ideas of the life they are to live and treatment they are to receive. Rather frequently the idea has been expressed that they expected to live a life of physical activity in the open, and others show that they have the greatest faith in drugs. To them the whole treatment consists in the administration of drugs.

When the writer was placed in charge of the admission wards for men he soon became convinced that he was needed more as a teacher of proper living than as a prescriber of medicines. The teaching field is the larger and capable of producing more benefit to the tuberculous sufferers. The living conditions and the life they live constitute the major part of the treatment. Some patients do not require any drug treatment because under proper living conditions they do not have troublesome cough, fever, sweats, hemorrhage, pleurisy, digestive or intestinal trouble, eat and sleep well. Naturally those are capable of making the best progress.

The first thing which the patient should be taught after the diagnosis has been made is that the trouble is tuberculous. That should be stated clearly and forcibly, early, and his coöperation commanded. There should be no equivocation.

Place for treatment. Treatment may be conducted at home or away from home. Comparatively few are so situated that treatment at home can be maintained with satisfactory result. The average patient and all patients of limited means are better treated in a sanatorium or hospital organized for that purpose. In general those institutions which provide the best medical and nursing supervision obtain the best result.

Very frequently the doctor will be asked as to the wisdom of going to Colorado,

[1]This article was prepared at the suggestion of Col. Edward Martin, M.D., Commissioner of Health of Pennsylvania, and approved by his successor, Dr. Charles H. Miner, and by Dr. Henry A. Gorman, Medical Director of State Sanatorium, Hamburg, Pa.

New Mexico, Arizona, California, North Carolina, etc. The patient should be made to understand that certain climates are better than others, but that there is no ideal climate. A dry soil, dry air, with sunshine, and a comfortably cool day and night, provide a distinct advantage, but there are no such places the year around. There are a cold winter and a hot summer—difficult to escape; and in the very dry regions there are rapid changes in temperature, and dust storms. Patients in this latitude do best in September, October, and November. The best climate in any State is only a few per cent better than the best climate in the other States.

The advantage of the climate in the southwest is not the only item to be considered. It is proper to advise patients that that section has real climatic advantages, but it is an expensive proposition to procure them. A tuberculous patient who is a total stranger in that section and is able to spend three thousand dollars or more a year for living and medical expenses, and is not disturbed by a life far from home and among strangers, is in a position to be benefited by that climate; but if he has not that amount of money and cannot escape homesickness, he should not consider going to that section. So many unsuitable cases of tuberculosis are sent into the section from Colorado south to California that the region has an appalling tuberculosis death-rate. Most patients are best cared for in hospitals and sanatoria located in their county or State.

After the tuberculous patient has had treatment in a well-organized and supervised hospital or sanatorium for at least several months, it is reasonable to expect him to continue the treatment with profit at home. The medical and nursing supervision at home is not so close as in the institution and living conditions are not so favorable, but an honest, earnest patient can do well.

The patient has selected his location for treatment. He has decided to remain at home, go to a hospital or sanatorium organized for that class of case, or he is going to a distant climate. It is the privilege and duty of the physician in attendance to prescribe any and all necessary drugs, but it is also his part to instruct the patient that it is Old Dame Nature who brings about a cessation of the advance of the tuberculous process and the restoration to health. Nature does that and not the doctor. It is the function of the physician to interpret to the patient the requirements of Old Dame Nature and to direct treatment intended to aid nature.

The first law of nature pertaining to health is that in order to remain well we must not consume more energy than we produce. Every person who has clinical tuberculosis has violated this law, and for his violation of it he has been punished to an exact equivalent. Old Dame Nature is the embodiment of justice, but has no kindness, no gentleness, no generosity, and no forgiveness. A violation of her law means a punishment to the exact equivalent. She takes her pound of flesh, perchance five, ten, twenty-five, fifty, and in one case over one hundred pounds. There is no escape if the law is violated.

The law for recovery is that the expenditure of energy must be below the production. Becoming more sick means that the expenditure of energy is greater than the production, while recovery means that the reverse is the order. These two processes are on the same road; one is going one way and the other in the opposite direction.

It is a comfort to know that every bit of energy that we give to Old Dame Nature for our recovery will be used wholly for our benefit. She is wise; she knows how; she is honest—no graft, no toll. Everything is used perfectly for our good. We can observe the effect. Part of this excess of energy will be used to aid in digesting our food. We can then eat more, the appetite improves, the weight, strength and endurance increase, the cough and sputum begin to diminish, and there is appreciation of improvement and well-being.

The sick person is able to give energy to Old Dame Nature simply because he has

not spent it for some other purpose. This is purely a question of living expenditure. The use of a certain amount of energy is necessary to maintain the circulation, respiration, digestion and elimination of the waste products. The state in which we physiologically maintain life with the least expenditure of energy is when we are in bed, relaxed and sound asleep. The next state involves an additional expenditure of 13 per cent of energy, and that is when we are in bed, awake and relaxed. When we sit on a dining-room chair, that requires the expenditure of an additional 21 per cent of energy; sitting in a reclining chair does not consume so much power, and walking at an ordinary pace on the level means about 100 per cent advance, while rapid running or hard muscular work advances the expenditure from 600 to 1000 per cent.

Some patients are so ill that it is not possible to keep the expenditure of energy below the production. They are doomed. Death is inevitable. Others by lying quietly in bed can give day by day energy to nature which she can use for recovery; while others are not so ill and can be more or less active and still produce more energy than they consume. Physical activity is a necessary part in the process of recovery, but it must be so directed, so graduated, so supervised that there is energy left for Old Dame Nature. That is the most important part of the function of the medical adviser. He must so supervise the life and activity of the patient that there is a constant reserve of energy. The amount of that daily reserve of energy is broadly the measure of the progress of the patient toward recovery.

Source of energy. The elements which contribute to the production of energy are food, air, light, sunshine, and heat. The patient frequently needs to be instructed to take his meals regularly and on time. Tuberculous patients need to be taught that they should go to bed early, have a good night's sleep, and rise early in the morning, eat breakfast, and later, if in condition, have exercise followed by quiet in the open air. After dinner the patient is benefited by a rest in bed asleep for an hour or more. Another period of pleasant inactivity in the open air will prepare him for supper. In addition to the three regular meals daily, many patients are improved by a drink of milk and a raw egg in the mid-forenoon and before going to bed.

It is the custom with some physicians to give large amounts of milk and many eggs daily and only one meal, but the usual method, and the one that generally appeals to the appetite and does not disturb digestion, is the three regular meals daily with milk and eggs morning and evening if the taste, appetite and digestion of the patient approve. The digestion of comparatively few people will stand the daily ingestion of a large quantity of milk and many eggs. It is the observation of many that patients who improve satisfactorily on regular meals are those who permanently do best.

Fresh foods, separately prepared and cooked at not too high a temperature, are most digestible. The digestibility of many substances is rendered difficult by being cooked in combinations. Preserved meats and fish are not so digestible as the fresh articles. Fats used in cooking are roughly indigestible with the height of their melting point. Animal oils and fats are more digestible—the melting being at the same temperature—than those obtained from vegetables. Cream and butter are the best of all fats. Milk is the only article of diet which is produced exclusively for food. Milk and the dairy products lead all other articles of diet in digestibility, palatability, and in the preparation of foods. Every patient should be instructed not to eat substances which he knows do not agree with his digestion or produce urticaria or asthma.

Fresh vegetables with thin leaves are a substantial aid to the diet. On account of the common reduction of weight of tuberculous patients a large amount of nitrogenous food—fresh meat, milk, and eggs—is advisable.

Patients who have normal or excessive weight for their height and age should not

be encouraged to increase the weight by forced feeding or extra milk and eggs.

An abundance of cool air day and night is invigorating, the lack of it is depressing. Light adds vigor, but it should be so controlled that it does not annoy the eyes. Direct sunlight has a great power for good. It is a destroyer of bacterial life, but in the intense heat of the summer the patient should be taught to remain in the shade.

When the patient has been taught the law of recovery of health, that the consumption of energy must be below the production, and has lived it until his condition is as good as it is possible for it to become, he should then be allowed to undertake the amount of work he is capable of doing. The patient should be taught that tuberculosis is crippling. In the early stage recovery is associated with crippling, but the more advanced the tuberculosis has become, the more serious is the handicap. Here is a discouraging phase of the work; so many patients have done so well and the condition is justifiable of hope, that he assumes responsibilities and physical expenditure of energy far beyond his ability to produce. The result is disastrous, and the patient fails more or less rapidly until his condition is worse than it was when treatment was started.

Two things must be impressed on the mind of the patient so strongly that he will not forget them. One is the first law of health, that he must not spend more energy than he produces; the other is that he is crippled and is not capable of doing the amount of hard work he was able to do before he became ill.

Many patients have an ambition to go to the country to live and work on the farm. That is destined to prove disastrous. Farm work for the untrained is the hardest kind of hard labor, and the remuneration is inadequate to provide a good living. The restored tuberculous subject should be taught that he must capitalize his knowledge and experience so that he can procure employment with which he is familiar of the grade that does not overtax his energy and at the same time gives him good remuneration. He is also to be taught to start with part time work and gradually advance as his physical development justifies. There are three things the patient must be taught to watch in this working period of his life. One is the weight. The patient should be weighed once a week and a record kept. The patient should be taught to take his pulse and temperature, and they should be taken every evening and a record kept. That is necessary for the instruction of the patient and the guidance of the physician. If the patient's weight starts to go down and the temperature and pulse to go up, it is perfectly evident that the employment is too strenuous and the activity must be reduced.

Work and play. Persons in good health generally have energy for both work and play. Play is to be commended especially for the children and the young, and the older people need fun and relaxation, but with the tuberculous the living wage is so important that all the energy available is necessary to be applied to earning a good living. He has energy enough for play or work in moderation, but not enough for both. Nature's law for remaining well is that we do not spend any more energy than we produce.

The most important principle that the tuberculous patient is to learn is that he love his neighbor as himself, and that he so live that the life and health of his family, relatives, friends and associates and the general public is not endangered.

When the Great Destroyer went over the land and the sea sowing tubercle bacilli, some went into the bodies of man, and after a long habitat they have adapted themselves to that soil so that they grow better there than elsewhere. Others went into the bodies of the cow and other quadrupeds, and have adapted themselves so that they find that their most favorable environment. Still others went into the common fowl and other birds, and have become so accustomed to living at the higher temperature that they find it most congenial for their propagation. Still other tubercle bacilli went into the bodies

of the cold-blooded animals and acquired the ability to live at so low a temperature that they do not grow in the chicken, the cow, or man.

The avian, bird or chicken, strain of tubercle bacilli does not readily grow in the quadrupeds or man, but does occasionally infect hogs, rats, and mice; but they very rarely if ever infect man. So far as human tuberculosis is concerned, the avian strain may be regarded as not a causal factor. Not so easy of disposal is the cow or bovine strain. The infected milk of the cow carries the tubercle bacilli into the bodies of children, and quite frequently the glands, bones, joints and serous membranes become tuberculous; occasionally the lungs are involved as part of the process; but in persons over fifteen years of age the bovine strain of tubercle bacilli appears in but a fraction of one per cent of the cases. In adults practically the bovine strain may be considered a negligible causal factor. In children that strain is not so virulent or fatal as the human strain.

The most favorable soil for the human strain of tubercle bacilli is the human lung. True it grows with destructive effect in the intestine, the larynx, the meninges, and is a serious complication in all parts of the body.

The diseased lung is the favorite location for the spread of the disease to other persons. The tubercle bacilli are carried out of the lungs by coughing and in the sputum. Those carried by coughing can be immediately inhaled by persons within three feet of the cough. The organisms in the moist sputum are not dangerous provided they do not contaminate the food and drink of other people, but they may be carried to other people in the dried powder of the sputum as dust.

The tubercle bacilli from the lesions in the alimentary tract and urinary tract escape in the feces and urine, but the likelihood of this reaching another human being is slight. Those discharges should be disposed of in such a way that the danger of infection from them is negligible. Surgical tuberculosis is not dangerous to others because the discharges are caught in the dressings and destroyed. Genital tuberculosis in man offers practically no possibility of the spread of the disease.

The lung disease is the serious danger of infection to others. The patient is to be taught to live so as not to be a source of danger. The method by which a person having active tuberculosis of the lungs may not be a source of danger to others is to catch all the tubercle bacilli that come from his lungs, keep them caught, and destroy them. A person who has pulmonary tuberculosis is not a source of danger if he catches and destroys all the tubercle bacilli which come from his lungs.

The tubercle bacilli that are coughed up with the droplets of moisture can best be caught on very soft paper napkins. These napkins are easily procured and are cheap. They may be fastened by wire clips to pieces of cardboard and folded so as to form a booklet. The booklet may be held lightly between the tip of the thumb and the fingers at the distal joint so that it opens easily, and when held close to the face can be coughed into and all the tubercle bacilli caught on the paper. When coughing ceases, the booklet may be closed and placed in the pocket or on the table, bed, or held in the hand, and the tubercle bacilli remain undisturbed on the paper. That surface of the napkin is not to be touched by the fingers, hands, face, or clothing. When the used napkin is removed it should be placed in a paper bag for that purpose. Loose napkins of the same kind may be used for wiping the nose, mouth, and drinking-cup. They, too, should be placed in the paper bag, and likewise the paper napkin used while eating.

The eating and drinking utensils used by a tuberculous person should be kept entirely apart, washed separately, and not used by other people.

All sputum should be caught in the sputum cups. Some of the sputum cups may be carried in the pocket, and another variety is adapted to rest on a table and is covered. When these cups have been used sufficiently long they should be placed in a

paper bag separately or with the napkins. The paper bags may be placed in a can or other container, and in it be transported to a fire suitable to burn the entire mass.

If the tubercle bacilli expelled by the coughing and sneezing are caught in the napkin and the sputum is placed in the sputum cups, and the bacilli not allowed to escape and are burned, that patient is not a source of danger to others.

In addition to informing the tuberculous patient of his condition and teaching him how to live in order to recover, to remain well, and not to endanger his neighbors, friends, and relatives, he should be instructed to have an observing eye and a listening ear for suggestive evidence of developing tuberculosis in members of the family, friends, and the general public. A cough which lasts for three weeks or more, hemorrhage from the lungs, pleurisy, ischiorectal abscess, repeated colds, decline in health, vigor, and endurance, are sufficient to justify a person who has had tuberculosis in advising the sufferer from one or more of those conditions to consult a physician who is familiar with tuberculosis. Every patient should be a focus for instruction of the neighbors in protection against tuberculosis. A present serious hindrance in the campaign against tuberculosis is the ignorance of and indifference to the disease. Tuberculous people can impress on others the importance of establishing rational treatment before the disease has wrecked the structure. Early treatment in nearly all cases restores the sufferer to health and a life of usefulness; while late treatment has a limited power and benefit.

CONCLUSIONS.

1. The diagnosis should be made early, and as soon as it is established the patient should be informed as to the nature of his trouble and his coöperation commanded.

2. The patient should be informed that the life he lives is the major part of the treatment; that the administration of drugs is important when drug medication is necessary.

3. The patient who spends more energy than he produces becomes more ill, while the one who spends only part of the energy he produces is living the life necessary for recovery.

4. Muscular activity is necessary to construct an abiding resistance against the tubercle bacilli.

5. The physical activity is to be directed and supervised by the physician. It is the important medical function.

6. The patient having recovered as thoroughly as his tuberculous condition will permit, should be instructed as to the life he may live and the amount of work he may do.

7. The means by which he may remain well is living so that he does not spend more energy than he produces.

8. Tuberculosis is an infectious disease, and adult human tuberculosis is derived, practically always, from a person having human tuberculosis.

9. The source of adult human tuberculosis is almost invariably the tubercle bacilli from the diseased human lung.

10. A person with pulmonary tuberculosis is not a danger to others when he catches all the tubercle bacilli escaping from the lung and destroys them.

Artificial Pneumothorax and Other Surgical Methods in Advanced Tuberculosis and Pleurisy.

In the *Indian Medical Gazette* for November, 1923, GRAVESEN states that the technique of the operation he used was according to Saugman's method. Many modifications have been suggested with regard to apparatus, needles, and technique. An ordinary siphon system with manometer joined on to the tube from the reservoir to the needle has been used by him. The type of needle used for the first injection was Saugman's pneumothorax needle; for the further injections Kjer-Petersen's needle was used (this needle is closed at the end and has its quarter-inch-long opening on the side of the needle, just near to its end). The reinjections do not cause any technical

difficulties, but the first injection has to be carried out very carefully, with an accurate knowledge of the conditions in the thorax and with a thorough familiarity with all technical details, as any mistake may involve considerable danger to the patient.

It is of cardinal importance never to allow any air to enter through the needle until the manometric movements show that the opening of the needle is in the free pleural cavity. If any air is forced in before the manometer shows the typical reaction, the air might enter into a blood-vessel and cause serious embolism. The manometer during the whole operation is always kept in open connection with the needle.

The first injection is usually given under local anesthesia of the different layers of the chest wall, preferably in the fifth intercostal interspace and in the midaxillary line, after an injection of morphia (¼ grain). Though no local anesthetic was given at the reinjection, no serious pain or trouble was caused to the patients.

Scrupulous asepsis is necessary. The needles and the cotton filters, by which the air is sterilized on its passage from the reservoir to the needle, are kept in a dry sterilized condition with formalin.

No serious complications took place in any of the cases under review. Of a more troublesome rather than serious nature was the complication of pleurisy with effusion in the pneumothorax. This complication was observed in about 50 per cent of the cases, and the same frequency has been observed by other authors. Without causing any harmful effect on the general condition, this complication sometimes gives an indication for aspiration on account of its disturbing influence upon the equable collapse of the lung. In several cases the effusion caused secondary adhesions with considerable difficulties in a continuance of treatment. In one case this complication made it impossible to continue the injections at all.

It was too early to make any final statement upon the results in 90 cases, as many of them were still at the beginning of the treatment and none had been observed for a sufficiently long time to give a reliable idea about the lasting effect. At the present stage, however, Gravesen feels justified in putting forward statistics which are the result of three years of research work, and to add to them a few notes with regard to the cases under review.

The author has had the opportunity of studying under Professor Saugman at Vejlefjord Sanatorium, Denmark, the largest number of cases regarding which results have hitherto been published, namely, about 400 "third-stage" cases treated with artificial pneumothorax. This material deals with cases which had been discharged from the sanatorium three to thirteen years before the statistics were collected. The material falls into two groups, which are to be considered equal with regard to extent and prognosis of the disease. One group includes cases in which practically no pneumothorax was applicable on account of pleural adhesions. The state of the patients of this group at the time of the statistical examination showed that only about 10 per cent were capable of work; the remaining 90 per cent had either died or were still suffering from the disease. The other group includes all cases in which a total or partial pneumothorax had been carried out. Of this group about 35 per cent were capable of work at the time that the statistical examination was made.

The difference between these two groups speaks emphatically enough in favor of the pneumothorax treatment, though none of the temporary results are taken into consideration. But a closer observation of the last group reveals the fact that still better results might have been attained if more or less localized adhesions had not exerted their effects, especially if, in this group, we confine our attention to those cases in which practically no adhesions were observed: the capability of work after three to thirteen years' observation was not less than 70 per cent—a percentage that will scarcely be met with in any other treatment for third-stage cases of pulmonary phthisis.

Editorial

POINTS AS TO THE LIMITATIONS OF INSULIN.

When a new and manifestly valuable addition is made to the list of remedies, it is of infinite importance that each member of the profession should control enthusiasm by rational thought and deduction.

As we have pointed out on previous occasions within recent months, the literature on insulin is becoming very large. Although an American discovery, it is being employed equally largely, if not more so, by British practitioners, and sometimes it is wise to go far afield and to take the views of those on the other side of the Atlantic in order to combine them with our own.

In a recent discussion on this subject, Sir Thomas Horder of London emphasized the fact which has been clear to all students of this subject for years, namely, that diabetes is not one biochemical disturbance only, but several, and it is hoped that insulin will serve to separate these cases so that our conception of them may be better. Already we know that certain cases of diabetes are benefited much less by insulin than are others, even when conditions as to diet, age, and general health are taken into consideration, and, as Sir Thomas points out, it is essential that this variation shall be borne in mind in order that doctor and patient may not occasionally be bitterly disappointed.

Sir Thomas has summed up, in what we consider a very concise and clever way, a number of points which we must bear in mind: First, does insulin act as a walking-stick to a lame pancreas, and can we by its use cause a recovery of the lost power of maintaining a normal blood sugar so as to carry on without its help? Again, at what level should the blood sugar be maintained in order that the insulin shall be most effective? Should it be at the normal level, or should it be a little below the normal level, or should it be as low as possible consistent with producing no untoward symptoms with the idea of resting the pancreas very thoroughly? He then adds this pregnant question: allowing that blood-sugar estimations have been imperative and essential to the proper study of insulin in treatment and the control of doses, will such estimations continue to be necessary in every case? If constant blood-sugar estimations are not necessary, at how long intervals is it safe to make accurate scientific control by blood-sugar estimations?

Again, he asks the question, can any general guide be given as to the best proportions of the main food principles which it is wise to employ in venturing upon an increase in diet when by the use of insulin and starvation the blood-sugar is kept within a normal range for several days; that is, should it be protein 4, fat 2, and carbohydrate 1, or some other ratio, or are we to learn that each case is to be regarded as a law unto itself?

Additional points are the danger that the greedy glycosuric will insist upon free feeding and the use of insulin, and, more important still, we must recognize that there are cases of renal glycosuria which are not diabetics at all and which do not need insulin.

Lastly, we must never forget that the general condition of the patient who has been subjected to the drain of sugar upon his general vitality must greatly influence the prognosis, whether insulin is used or not.

In discussing the paper of Banting, which followed the introductory remarks made by Sir Thomas Horder, Cammidge, who is so well known for his investigations in connection with digestion and assimilation, pointed out that in the treatment of diabetic coma, in the control of serious acidosis, and

as a prophylactic in surgical procedures, insulin is of inestimable value, and then he summed up the difference between the Allen method of treating diabetes by starvation and the insulin method by adding the words, "essentially treatment with insulin is a means by which the effects of fasting may be obtained without the discomforts and dangers attendant upon prolonged absence from food;" and again he asserted that "permanent improvement of the food tolerance was only to be expected in those cases in which experience had shown that the fasting treatment was of material benefit."

Cammidge also emphasized a point made by Sir Thomas Horder, and to which we have already called attention, when he quoted the words of Joslin to the effect that insulin is not a universal cure for diabetes, and that it is cruel to make the public believe that it is. To express it differently, Cammidge believes that insulin is the most valuable means at our disposal for controlling defects in metabolism due to deficiency of the internal secretion of the pancreas, but it should not be looked upon as a remedy to be given indiscriminately to all cases at present classified as diabetes. His idea is that insulin has yet to find its true level in therapeutics.

Last of all our readers must bear in mind the emphasis which has been laid by Banting upon the danger of inducing a hypoglycemia as manifested in adults by a sense of impending danger, incoherent speech, sleepiness, and hunger, and in children by pallor, rapid pulse, and sweating, and that the treatment to be instituted under these circumstances, if the physician has been so unfortunate as to make an error in administration, is the immediate administration of 10 to 15 minims of adrenalin hypodermically; Banting stating that this usually restores consciousness in two minutes because it rapidly throws glycogen from the liver into the blood stream. As soon as consciousness is restored, from 3 to 6 drachms of glucose are to be given by the mouth.

THE TREATMENT OF EMPYEMA.

The treatment of this by no means uncommon complication, or sequel, of pneumonia has undergone very marked changes in the last few years. Physicians and surgeons, for many years prior to the war, often expressed differences of opinion in regard to the measures which should be undertaken for relief. Both classes recognized that the pus should be let out. Physicians believed in many instances that puncture and aspiration was adequate in some cases, while many surgeons held that not only an intercostal incision but excision of a rib was also essential. In some instances a middle ground was followed and drainage was established, but these cases often did badly because secondary infection of the pleural cavity occurred.

The grouping of large numbers of men during the Great War and the outbreak of the great epidemic in 1918-19 offered an opportunity for the medical profession to make many observations in a comparatively brief period of time which were of the greatest possible importance in connection with this question. The first and most important decision reached was that it was a vital mistake to resort to radical measures until the patient had had time to recover from the effects of the acute illness which had induced his empyema, aspiration being resorted to as a temporary measure if pressure symptoms were urgent, and being repeated as often as necessary until the patient was able to stand more radical means of relief if needful.

The next conclusion that was reached was that the closed method of treating acute empyema was not difficult and was satisfactory. The open method is almost certain to be followed by further infection. The closed method, which is a form of continuous drainage, consists in strict antisepsis so far as the surface of the body is concerned, followed by puncture with a trocar and cannula after the chest wall has been anesthetized by injections of small

quantities of novocaine. Through this cannula a No. 14 catheter, clamped at its distal end, is pushed through the trocar, it being essential that the greatest possible care shall be taken to have the cannula fit the trocar so tightly that it must be lubricated with sterile olive oil or sterile petrolatum. The object of this procedure, of course, is to prevent the entrance of air carrying infection. Another measure to prevent such an accident is the custom of making the catheter fast in place by adhesive strips rather than by puncturing it with a safety-pin. The aspiration apparatus is now attached to the outer end of the catheter, and after the attachment is made airtight the clamp is released and the fluid withdrawn. In prewar days when this method was employed, the physician was often balked by the fact that the pus was so thick that it could not be withdrawn after the first aspiration, but this difficulty is put aside by the use of Dakin's solution, which liquefies the contents of the pleural cavity.

A very important point in connection with this method of treatment is frequent aspiration with frequent injections of the chlorinated solution, the amount of the latter equaling about one-third the amount of the pus which is removed. If the pus is not particularly thick and there is some excellent reason for so doing, the intervals between aspirations and injections may be lengthened to three or four hours during the night.

In general terms, the description which we have just given is that which we believe to be followed by those who have had the best results in this city and elsewhere.

In a recent paper by Bettman he makes one important addition to the above advice which should be followed, namely, that the tendency of any excess length of catheter which enters the chest is to pass upward toward the apex rather than, as one would think, toward the base of the chest. The result is that little pus is obtained, when, if the aspirating tube is withdrawn a short distance so that its tip falls into the lower portion of the pleural cavity, a free flow will occur. When possible, it is advisable to *x*-ray the chest to determine exactly where the internal end of the catheter is.

Treatment should be continued until a bacteriological examination of the aspirated fluid has proved it to be sterile and the cavity which has contained the fluid obliterated. If the catheter is withdrawn before these two things occur, reinfection, as Bettman well points out, is prone to occur. Blowing through a Wolfe bottle and the use of chest exercises make up the subsequent treatment to maintain the proper condition of the chest wall.

The points which Bettman has so well emphasized, and which are perhaps too often ignored, are the precautions against secondary infection, the necessity of constant repeated treatment, and the avoidance of what may be called the old-fashioned radical measures except in certain peculiar cases, many of which have already suffered from a secondary infection.

AN ACCIDENT WITH NOVOCAINE.

It is not often that a practitioner feels called upon to report to a medical journal an accident which has occurred in his practice: first, because in many instances it does not contain a lesson which would be useful to his colleagues, and, secondly, because it is not a human attribute to discuss one's errors, mistakes, or misfortunes.

In a recent issue of the *Journal of the Missouri State Medical Society*, however, a surgeon reports a case in which no less than 9 grains of novocaine were accidentally given by intraspinal injection. Perhaps the most interesting point in connection with this report is that notwithstanding the desperate state of the patient, she ultimately recovered. Another interesting point is that the reporter states that the patient was placed in the Trendelenburg position, and also states that he has made inquiries as to

what would have been the best plan of treatment to follow of another operator who has used caudal bloc in a large number of cases. While we have no doubt that the symptoms from which the patient suffered, and which we will detail in a moment, seemed to indicate the Trendelenburg position, nevertheless we believe it to be a fact that such a posture aids very materially in the transference of an anesthetic which may have been given intraspinally to the upper spinal cord and medulla, and it will be remembered that those who have used intraspinal anesthesia most largely have pointed out that the higher the injection is given the greater is the necessity of keeping the patient's head elevated.

The patient in this instance was a woman of fifty with a negative history, save that about a year before she had been subjected to hysterectomy, and at the moment was suffering from a bleeding cervix which was to be treated by the insertion of a radium tube. The pillow was placed under her lower abdomen to elevate the sacrum, she being in the prone position. The needle was inserted into the sacral canal about two and a half inches. No spinal fluid was obtained, and for this reason the operator felt that he had not entered the subarachnoid space. He, therefore, injected a 2-per-cent novocaine solution to the extent of 25 cc, with an additional 5 cc as the needle was withdrawn. The patient was then asked to turn on her back, when she said she was numb and could not turn. She developed complete anesthesia on the lower portion of the body and limbs, vomited, had a fear of impending death, became unconscious, cold and clammy, with widely dilated pupils, and breathed about three or four times a minute. Only a very faint heart sound could be heard. She was given normal salt solution in the femoral veins with 2 cc of adrenalin, strong black coffee with 2 ounces of whisky and one ounce of glucose by the rectum, and 4 grains of caffeine, 1 grain of sparteine sulphate, and 1/60 grain of strychnine hypodermically. At the end of forty-five minutes from the time of the injection the pulse could be barely felt at the wrist, the heart sounds were still indistinct, running about 167 per minute, the respirations were 6 to 8 per minute, but the pupils began to contract, and fifty-five minutes after the injection she opened her eyes. At the end of seventy minutes she became perfectly rational, but on pinching her with hemostats it was found that she was completely paralyzed from the base of her skull down. At the end of eighty minutes the paralysis began to disappear, first in the arms and next in the feet and legs, and lastly in her abdomen and chest. An hour and thirty-five minutes after the injection no paralysis remained.

The last question which the author asks in reporting this case was, "Why did we get such extensive paralysis?" We are inclined to think it was due in part at least to the position in which the patient was placed.

The chief point of interest in this report lies in the fact that so large a quantity of this drug entered the subarachnoid space without inducing a fatal result.

THE INFECTIVE AGENT IN ACUTE FOLLICULAR TONSILLITIS.

In a recent issue of the *Johns Hopkins Hospital Bulletin*, Felty and Hodges report certain investigations which they have made which lead them to the very positive conclusion that the specific microörganism causing this condition is the streptococcus hæmolyticus of the type described by Brown. They quote a large number of authors who have written upon this subject, pointing out that various microörganisms, such as the staphylococcus, the streptococcus viridans, and the pneumococcus, have been considered as the organisms usually responsible. They combat these views, however, and while admitting that occasionally other germs than the streptococcus

hæmolyticus may be the cause, they believe it is almost universally the active factor in producing this condition.

After carefully describing the symptoms suffered by the patients with acute follicular tonsillitis, which, all of them, are familiar to medical men of experience, they make the point that the characteristic termination of the fever is by a sharp fall to the normal within eighteen hours, although, as in most cases of disease, this does not invariably occur.

The point which our readers will probably be most interested in, however, is what they have to say concerning treatment. They believe that acute tonsillitis, like other streptococcus infections, is a self-limited disease of short duration, which, once established, cannot be aborted or greatly shortened in its course, and that there is no specific therapy available at this time, aside from maintaining an active condition of the bowels. They suggest the use of Dover's powder with phenacetine, acetanilid, or acetylsalicylic acid, the use of an ice collar, and providing sufficient sleep.

Our readers will also be much interested in their statement that the use of so-called antiseptics, such as argyrol, the mercurochromes, and nitrate of silver, are to be condemned because the infection is not superficial, but has penetrated so deeply that local applications cannot do more than destroy surface bacteria, and they believe that these local applications tend to increase infection as a result of the insult provided by the applicator. Normal salt solution used as a gargle, or by irrigation, often gives a good deal of relief.

In this connection it will be of interest to those of our readers who graduated thirty or forty years ago to recall that distinguished medical men of that time were in the habit of treating all septic infections by means of iron, quinine, and whisky. So far as we know this form of general treatment is still the best in that form of streptococcus infection called "erysipelas." It has been widely employed with a good deal of success by many practitioners for many decades, and we are inclined to think produces more curative effect than the drugs which we have already stated are being recommended. Whether it is wise to use the coal-tar products for the relief of pain whereby the temperature chart is prevented from representing the severity of the illness, is a question which each one must determine for himself. Personally we have a feeling that these products, used in the presence of an acute infection, diminish, rather than increase, vital resistance, and that the symptomatic benefit which follows their employment does not compensate for the evil effects which they may induce.

THE STATE OF THE HEART IN RELATION TO THE USE OF AN ANESTHETIC.

The physician when he practices what is commonly called in these days "internal medicine" not infrequently has referred to him, by a dentist or by a surgeon, a patient with the request that an opinion be given as to the condition of the heart and the safety of the administration of an anesthetic. Under these circumstances the physician shoulders a very grave responsibility, and, to use a slang expression, the dentist or the surgeon "passes the buck," because if any disagreeable complication arises he can truthfully say that the anesthetic was given only after an opinion from an internist was obtained, and that that opinion was favorable.

An eminently practical paper was recently contributed to the Proceedings of the Royal Society of Medicine by Goodall of London, who, having been at one time an anesthetist, recalled that the average anesthetist takes a good deal of responsibility, submits to a good deal of personal discomfort, and receives in return a good deal of blame if things go wrong, with very little credit if things go well.

We think that it is remarkable that so few cardiac accidents are met with in view of the very general use of anesthetics with-

out careful preliminary examination of the circulatory system. Nevertheless, we agree with Goodall that a thorough and complete examination of the patient before an anesthetic is used is wise, and that more constant coöperation between physician, surgeon, and anesthetist should be practiced.

Goodall then proceeds to classify some of his cases, and the general practitioner will be interested to note that he does this on the basis of clinical observation rather than by calling to his aid the technical apparatus which is now so largely used. He speaks first of the well-developed, overgrown, robust appearance of the young aortic regurgitant with pale lips, throbbing neck, and overdeveloped muscles, in contrast with the small, undergrown, red, or reddish-blue, patient with congenital mitral stenosis; the pinched, patchy face with tortuous temporal arteries and wasted body typical of cardiovascular degeneration; the yellowish, anxious face of infective endocarditis; the large white face of renal disease; the anxious expression of the face of the patient with angina. After the physician has looked for and found any one of these states, the results which he will get on palpating the blood-vessels are not to be forgotten both as to pulse-rate, venous distention, and the various forms of arrhythmia.

When the patient is examined by auscultation, Goodall believes that the discovery of a slapping apex beat means a poorly contracting ventricle, which in turn is due to one of three causes: a toxic myocarditis, the myocarditis associated with cardiovascular degeneration, or a condition when the ventricle is badly filled or badly stretched, as, for example, in mitral stenosis. Another important point is to determine whether there is a pulse deficit; that is, a difference between the apex beat rate and the radial rate.

We need not take space to remind our readers of the value of the apical presystolic thrill in mitral stenosis, which probably is best developed when compensation is complete or nearly so, whereas an intermittent presystolic thrill indicates less complete compensation or actual failure.

As to pulse-rate, the question which should arise is as to whether it is abnormally fast or abnormally slow. If below 40 such a pulse indicates heart-block or physiological bradycardia, by which is meant the very slow pulse sometimes seen in well-trained athletes. If the patient is well enough to take exercise the two conditions can be readily separated, for in the heart-block case exercise increases the speed little if at all, whereas the athletic heart on exercise will double its rate. Attention must be paid to the perpetual irregularity of the pulse due to auricular fibrillation, and care must be taken to separate extra systoles from such a type of irregularity, since extra systoles, either auricular or ventricular, may have very slight pathological indications.

Concerning the aortic sounds, Goodall points out that if in place of the normal short aortic second we find it accentuated, it is probably indicative of high blood-pressure, and that if it possesses a ringing quality, this sign is indicative of atheroma of the aorta with rigidity of the valves. Absence of the second sound may be due to a dilated aorta. When aortic regurgitation is present Goodall believes that if the murmur is harsh, loud, and just beneath the stethoscope when it is placed over the second right costal cartilage near the sternum, there is damage to the anterior cusp, which, by the by, is the lesion most liable to be connected with anginoid symptoms. On the other hand, he thinks that if the murmur is loudest over the third left costal junction, it being soft and blowing but never harsh, this is indicative of damage to the left posterior cusp, which is usually secondary to a mitral lesion.

Accentuation of the pulmonary second sound, of course, indicates obstruction to the flow of blood through the lungs.

Goodall fully recognizes the value of electrocardiographic examinations, which should be resorted to in all cases in which the condition of the heart is manifestly

grave, not only when an anesthetic is being considered, but when drug treatment is to be undertaken, but it is evident that there are many points which can be utilized in reaching an opinion when the patient is far removed from a place where such a valuable aid to diagnosis can be resorted to.

CHOLECYSTITIS AND GALL-STONES.

When pathologists announce as the result of autopsy performed on many thousands of subjects, that their records show gall-stones in 10 per cent of all examinations of those who have lived more than twenty years, the inference would seem clear that in America, for instance, there are many million people, the great majority rejoicing in perfect health, whose gall-bladders contain stones. If this conclusion be accepted as true it would seem to negative the commonly accepted idea that gall-stones are necessarily related to cholecystitis, or, if they so be, that such inflammation of the gall-bladder has, in the vast majority of cases, a pronounced influence on the general well-being of the individual.

Because of the circumstance that such inflammatory lesions of the gall-bladder, whether accompanied by stones or not, as come to the surgeon and are subject to operation, usually demonstrate infection, streptococcic, colonic, or typhoid, and that the nuclei of stones are found to consist of infectious material, the profession at large has accepted the teaching that infection is a necessary and predisposing cause of cholecystitis, and that stones are a frequent but not invariable adjunct to this inflammation.

In a review of the chemistry of gall-stones Hurst *(The Practitioner,* November, 1923) notes that the vast majority of these concretions are made up of cholesterol; that this cholesterol is held in solution by the bile salts, and that it may be precipitated either from actual increment in quantity, or from a decrease in the bile salts content and the liver secretion. If the liver cells are unable to form cholalic acid in sufficient quantity to form bile salts by combining with taurin and glycocoll, there may be precipitation from a quantity of cholesterol which in another individual whose liver cells functioned properly would be entirely dissolved. He has noted that bile concentration is in proportion to that of cholesterol in the blood; that patients with gall-stones usually show an increased percentage of blood cholesterol. This blood cholesterol in turn depends upon the quantity taken in with the food and that manufactured in the body, the source of the latter being the corpus luteum and the cortex of the suprarenal glands. The hypercholesterolemia of pregnancy seems to have a direct relation to the greater incidence of gall-stones.

As for the food source of cholesterol, egg yolk is particularly rich in it, whilst milk fat and visceral foods, to-wit, liver, kidney, and pancreas, contain appreciable quantities—in fact seem to stimulate its production. It has been demonstrated beyond doubt that cholesterol stones may form in the absence of infection, but there can be no question that infection favors gall-stone formation. This is necessarily associated with some degree of stasis and provides nuclei about which the cholesterol may be precipitated.

As for the symptoms of gall-stones, the patient's main complaint in the majority of cases is dyspepsia and a sense of fulness coming on irregularly without distinct time reference to meals, to activity, or unrelieved by alkalies; often accompanied by nausea, at times by headache or vertigo. There may be vomiting which gives only partial relief. These general dyspeptic symptoms may have crises of sharp transient pain, again without relation to food or activity. If there be obstruction of the common duct there may be either slight jaundice or excessive bilirubin in the urine, or before it appears here, in the blood.

Pain and tenderness of such inflamed gall-bladders as do not exhibit the symptoms of acute obstruction are placed over the gall-bladder or near its base, around the right of the chest. At times these symp-

toms may be centered at the angle of the right scapula, especially during a subacute attack. The painful areas find their distribution in the seventh, eighth and ninth dorsal segments, from which come the sympathetic fibers to the stomach and gall-bladder.

Hurst regards gall-bladder tenderness as the most characteristic sign of cholecystitis. It is well marked after an attack of colic, whether abortive or severe, but persists even when dyspepsia without characteristic pain is the dominant symptom.

At times the *x*-ray will throw a faint shadow even with cholesterol stones. There is often associated achlorhydria and an increased percentage of cholesterol in the blood.

As to the diagnostic value of examination of bile and duodenal contents, if the gall-bladder be infected Hurst states that pus cells and cholesterol crystals are often found. He further states that the cholecystitis incident to various infections of the bile generally disappears spontaneously, and that in the early stages of gall-bladder disease conservative treatment is often attended by results, holding that even though there be deposit of cholesterol crystals in the gall-bladder these may be redissolved if the bile be made to contain an excess of bile salts and further stagnation be prevented by frequent evacuation of the gall-bladder contents.

As for diet, eggs, kidney, sweetbread, brain, and liver are eliminated. Fat is reduced to its minimum. Pregnant women are advised to avoid the yolk of egg during the last four months of child-bearing. If bile drawn through a duodenal tube is found to contain infective organisms, sodium salicylate 10 to 20 grains, or aspirin, should be given three times a day, continued for some months thereafter at intervals. Urotropin is advised in full doses, combined with sufficient potassium citrate to keep the urine alkaline. Hurst begins with a dose of 20 grains of urotropin and 60 grains of potassium citrate, and increases by 10 grains daily the quantity of urotropin until irritability of the bladder or a trace of blood in the urine warns him the limit has been reached. The dose is then reduced to the point of tolerance and continued for some weeks with a rest of two days in each week. The average of tolerance is from 60 to 90 grains a day. Thus the author reports he has completely sterilized the infected bile in several cases of cholecystitis, and coincident with this sterilization gall-bladder tenderness disappeared, as have other signs of gall-bladder infection.

Search for other focal infections should be most thorough, and in case the bile be infected autogenous vaccines seem worthy of a trial as a means of preventing biliary stasis. Meltzer has shown that by a concentrated solution of sodium sulphate thrown into the duodenum, the effect produced on the gall-bladder and Oddi's sphincter is precisely that of acid chyme. It has further been shown that it is not necessary to introduce this solution by a duodenal tube, but if taken by mouth an hour before breakfast it will be equally efficient. The flow of bile in half an hour after ingestion of this fluid is as abundant as that obtained by introduction of the solution by tube. Hurst advises the ingestion of from one to four drachms of magnesium sulphate in concentrated solution, the dosage depending upon the condition of the patient's bowels, thus insuring at least one complete emptying of the gall-bladder daily. Visceroptosis is, of course, corrected by abdominal supports, and exercises up to the patient's strength are encouraged, particularly those involving the diaphragmatic muscles and implying larger and more frequent excursions of the diaphragm. The fact that olive oil at times relieves gall-bladder dyspepsia is explained on the basis that it inhibits gastric secretion and spasm. Tincture of belladonna is servicable where there is achlorhydria. Olive oil only aggravates the symptoms. The author advises the use of a drachm of dilute hydrochloric acid given in five ounces of sweetened orange or lemon juice and water.

Operation is advised when the symptoms

are distinctly those of gall-stone, to-wit: dyspepsia, local tenderness, obstruction, infection. Hurst advocates, and strongly, cholecystectomy in all cases even though the gall-bladder at the time of operation be not obviously diseased, and after operation insists upon care in diet. He continues magnesium sulphate from time to time, and a course of urinary antiseptics.

ILEOCECAL INCOMPETENCE.

There is a general law of sphincters by virtue of which the normal condition is one of contraction, or closure of the opening. The physiological departure from this condition is incident to a reflex stimulus. When irritated the sphincters contract with needless vigor and persistence and yield reluctantly and imperfectly to the normal reflexes. A condition of habitual relaxation is unusual. The ileocecal sphincter, by virtue of which there is a long retention of the content of the lower segment of the ileum, which has both a mechanical and a muscular closing mechanism, when disturbed in its equanimity and normal function by an adjoining chronically inflamed appendix, manifests this disturbance by failing to respond to the reflex stimulation incident to gastric peristalsis. This is one of the causes of that constipation so characteristic of chronic appendicitis.

This being the law of the sphincters, the paper by Jones (*American Journal of Medical Sciences,* November, 1923) based on an analysis of 1000 cases of ileocecal incompetence is worthy of careful consideration. It is assumed in this paper that ileocecal incompetence is the usual accompaniment, if not one of the causes, of that form of intestinal toxemia characterized by general ill health and often abdominal pain, and which Lane has attributed to stasis. The author does not make clear his method of distinguishing between the normal ileocecal valve and one which is chronically, and persistently or intermittently, and abnormally relaxed. He endeavors through his case records to prove the close relation between cases of hypothetical incompetence and mobile cecum, and contrasts the incidence of ileocecal incompetence of healthy people with that of those classed as abnormal. His figures are not convincing.

Bearing on the cecum, this portion of the gut is normally mobile and must so be properly to function. One of the causes of the constipation and incidental toxemia of chronic appendicitis is the interference with this free mobility by an anchored appendix. Reverting again to the law of the sphincters, they all yield to steady and continued pressure, or that suddenly exerted in a sufficient degree to overcome the power of contraction. The cardiac sphincter of the stomach is practically never incompetent, though it yields to the vomiting effort in babies with extraordinary ease, to that of adults with some difficulty. Incompetence of the pyloric sphincter remains to be demonstrated.

It is well known that by rectal injection of either fluid or gas, long continued under moderate pressure, the resistance of the rectosigmoidal sphincter, of the ileocecal sphincter, of the pyloric sphincter and of the cardiac sphincter may be overcome, and that the fluid or gas may be vomited or belched from the mouth.

The resistance of the sphincters varies greatly in the same individual at various times and in various conditions. Any or all of the sphincters in certain individuals may be weak, although this is exceptional. That an incompetent ileocecal sphincter is responsible for either local abdominal symptoms or general systemic poisoning in many patients remains to be proven. That it is associated with other intra-abdominal pathology seems far less probable than that some degree of sphincterismus should be a manifestation of these underlying conditions.

Jones states that there is a moderate degree of ileocecal incompetency in healthy people without any symptoms, but that these people will probably show on exam-

ination a mobile cecum, and that this condition is common in those who have abdominal distress. He places much dependence on relieving this somewhat hypothetical condition by fixing the cecum and descending colon on a kidney shelf. This, however, after a careful hygienic régime has been without effect.

In the hands of surgeons not unduly prejudiced in favor of fixation operations, such procedures have in their ultimate result been disappointing, so much so that even the perhaps biased reports of the few enthusiasts have not carried conviction as to the advisability of attempting to immobilize an organ which should be mobile in a theoretically advisable position when the patient is standing or sitting.

Progress in Therapeutics

Medical Therapeutics

The Prognosis of Syphilis.

FORDYCE, in the *American Journal of the Medical Sciences* for September, 1923, in summarizing his article, says the future of the syphilitic patient depends upon the knowledge and training of the physician first consulted. If familiar with modern diagnostic methods he will not neglect the employment of the dark-field microscope. A search for the treponemata may be rewarded by an examination of the fluid aspirated from the communicating lymph nodes after failure to demonstrate the organism in the primary sore. When the diagnosis is made the physician should impress the patient with the necessity for vigorous and thorough modern treatment and endeavor to make him appreciate the seriousness of the disease.

Mercury by mouth is a desultory way and is of no value in aborting the infection. Many patients receive insufficient treatment because physicians have not acquired accurate knowledge of the modern specific drugs and are ignorant of their proper administration. This criticism is as valid now with our greater knowledge as formerly before our modern studies of the disease. The fault to-day lies not only in the lack of training on the part of the physician, but also in his failure to impress the patient with the necessity of continuing treatment long after the symptoms have disappeared. All physicians treating syphilis should have a thorough knowledge of the pathology of the disease and its possibilities in the early as well as the late stages.

In the primary stage, before the Wassermann reaction becomes positive, a cure generally may be assured by intensive treatment. At least two courses of eight doses each of arsphenamine and two courses of 15 injections each of mercury should be given. Continued observation and control by the Wassermann test and lumbar puncture are necessary as in the treatment of later stages.

In the secondary stage, after the Wassermann reaction has become positive, a cure is not so readily obtained, but is possible if treatment is thorough and not stopped as soon as the blood becomes negative. The positive reaction continues as a rule for some time after all the other symptoms have disappeared. Depending on the length of time the blood has been positive, patients should receive from two to three courses of arsphenamine and three or more courses of mercury. If the spinal fluid is positive, more treatment may be required, including intraspinal injections. Cure should be pronounced only after a long period of observation. A guarded prognosis should be given when the disease has progressed beyond the early secondary stage.

A symptomatic cure is possible in latent

and tertiary stages if adequate treatment has been given, even in so-called "Wassermann-fast" cases. Adequate treatment means the administration of not less than two to four courses of arsphenamine combined with and followed by mercury, iodides, and mixed treatment. In the so-called "Wassermann-fast" cases an examination of the spinal fluid is imperative.

The progress is not favorable in certain types of neurosyphilis. This statement applies especially to the degenerative stages of tabes and paresis. It is, however, possible to anticipate and arrest the progress of early active tabes and paresis. The majority of cases do not respond to treatment as ordinarily administered. Early cases of neurosyphilis which do not respond to intravenous treatment combined with mercury are generally cured by intraspinous treatment. Paresis and tabes result from neurosyphilis improperly treated in the early stages.

In congenital syphilis, with the old methods of treatment it was impossible to obtain a negative Wassermann reaction, and even now the prognosis is not as favorable as in the acquired disease because of the severity of the infection, interference in the development of the growing tissues, and the difficulty of carrying out the treatment.

In congenital syphilis with involvement of the central nervous system, because of the technical difficulties in treatment the prognosis is less favorable than in the similar type of syphilis in adults.

It is frequently necessary to give a prognosis because of contemplated matrimony. While a rigid standard cannot be maintained physicians should endeavor to obtain a negative Wassermann reaction in the blood for one or two years after adequate treatment, with a negative spinal fluid, before giving consent. The patient should remain under observation for several years. If the patient be a woman with a positive Wassermann reaction, treatment should be begun during early pregnancy and continued throughout.

Marriage may be permissible in spite of a positive blood Wassermann if thorough treatment has been administered. In exceptional cases after prolonged treatment and after the expiration of at least five years from the time of the infection and two years' freedom from all symptoms, a conditional consent to matrimony may be given.

The marriage of heredo-syphilitics with the disease still active is not desirable, even though the danger of transmission of infection to the third generation is negligible.

We must remember that untreated or imperfectly treated syphilis is essentially a relapsing disease. In thoroughly treated cases, however, the prognosis is favorable.

The modern criteria of cure are dependent on: (1) Adequate treatment; (2) a negative Wassermann reaction, for at least a year after cessation of all treatment, which continues negative after a provocative injection of arsphenamine; (3) a negative spinal fluid; (4) negative findings in the cardiovascular system. The early involvement of the cardiovascular apparatus may be followed by changes in the heart and aorta with a negative Wassermann reaction.

In this paper, which is more or less fragmentary and incomplete, many factors which influence the prognosis of syphilis have not been touched upon. Fordyce would like to suggest to those who treat syphilis to acquaint themselves more accurately with the possible toxic effects of the modern arsenicals. Has the hypertension which is at times met with after prolonged treatment any relation to the known toxic action of arsenic on the blood-vessels? How long is arsenic stored in the liver after the cessation of our usual courses of the drug? Can jaundice be prevented by a non-protein diet during treatment? Is the elimination of arsenic hastened by the simultaneous use of the iodides? To what extent do our various methods of giving arsphenamine develop arsenic-fast strains of the treponemata and thus render our further therapeutic attacks less efficient?

Otitis Media.

CURTIN in *The Practitioner* for October, 1923, states that the condition may end in any of the following ways: (1) In complete recovery; (2) may merge into the chronic variety; (3) cause an abscess in the mastoid antrum; (4) extend to the brain.

In the early stages the aim should be to combat the pain. Drops containing cocaine and carbolic acid should be prescribed:

℞ Acid. carbol. liq., min. v;
Cocain. hydrochlor., gr. v;
Menthol., gr. v;
Glycerini, dr. j.

Steam to the ear is very soothing, as is also bloodletting by leeches applied to the front of the ear. Dover's powder should be given to stimulate perspiration.

Should this line of treatment not give relief, and the pains increase, paracentesis of the membrana tympani is indicated. In order to select the proper site, it is customary to map out the membrana tympani into four quadrants, viz., anterior superior, anterior inferior, posterior superior, and posterior inferior. The most suitable spot is the posterior inferior quadrant, because no important structures are liable to be injured here by the knife. Having selected the area the drum is anesthetized by a solution of cocaine hydrochloride 10 per cent, to which a little adrenalin is added. When this has taken effect, usually in about five minutes, the membrana is incised.

After paracentesis, inflation by the Politzer bag drives out pus into the external auditory meatus. The pus is mopped up with dry tampons, and a strip of iodoform gauze inserted into the meatus to act as a drain. Should the discharge not diminish with this treatment, hydrogen peroxide should be instilled and boric acid dusted on the drum.

Astringents often give good results when antiseptics fail. Zinc sulphate in weak solution is about the best of these: Zinc sulphate gr. vj, water to make 1 ounce. Ten to fifteen drops to be put into the meatus for about ten minutes. A very good method is washing out the tympanic cavity by the Eustachian catheter with a weak boric solution 1 per cent. Lastly, the middle ear must be protected against external influences.

Chronic suppuration has many things contributing to it: It may follow as a sequela of the acute form; formation of polypi in the middle ear; retention of the discharge; caries of the surrounding bone; nasopharyngeal troubles, *e.g.*, adenoids, enlarged tonsils, pharyngitis; sepsis through the external auditory meatus.

Chronic suppuration may last for years. An additional factor, often forgotten in the study of the disease, is the number of recesses to be found in the tympanic cavity; in disease, supplementary ones are often found in addition. Therefore it is easy to understand that secretion may stagnate and decompose in one of these little pockets, a small focus being sufficient to keep the trouble going. This fact has to be borne in mind in the treatment, as we shall see later.

The aim of treatment should be to prevent stagnation of secretion in a septic cavity, and to disinfect it. The discharge is removed by syringing it out and by inflations of the Politzer bag. A few of the antiseptics that may be used are: Potassium permang., 1 in 2000; or formalin, minim vj to 1 pint, are excellent for discharge with fetid odor; or hydrogen peroxide, 10 vols., or boric acid.

Postnasal conditions should be attended to. Adenoids and enlarged tonsils, sinusitis, and chronic pharyngitis should each have appropriate treatment, for an inflammatory process in this region will readily spread along the Eustachian tube, and so prevent applications to the ear having proper effect.

Of the various treatments, drops and syringing are what are most commonly in vogue, but there is another method known as the dry treatment. Liquids, either in the form of drops or syringing, are avoided altogether. The discharge is removed by mopping out with aseptic tampons and the use of the Politzer bag. Antiseptic powders are then blown onto the diseased surface

The protracted use of antiseptics will certainly keep up a discharge of itself, but against that it has to be borne in mind that a powder will not reach every portion of a diseased cavity, whereas a liquid can travel freely about it.

From a practical point of view we may say that, if the discharge is profuse, syringing and drops is the correct method to employ. If the discharge shows a tendency to lessen, the dry treatment is called for.

The Medical Treatment of Early or Suspected Duodenal Ulcer.

RYLE, in the *Lancet* of October 13, 1923, in its columns on "Modern Technique in Treatment," states with regard to rest and warmth that gastric rest is primarily obtained by general physical rest. With lowered activity on the part of the whole body food requirements are diminished, and the peristaltic and tonic activity of the stomach, subjectively expressed by hunger and appetite, are simultaneously decreased. In a similar way warmth also discourages excessive motility. The patient should, therefore, be put to bed in a warm room and with warm clothing, and only allowed up for visits to bath or lavatory.

Gastric rest is encouraged by a diet which calls for the least possible motor and secretory activity, and is not calculated to cause distention. The proteins, being the only foodstuffs undergoing an important phase of their mechanical and chemical digestion in the stomach, must as far as possible be excluded. Even to milk there is the objection that its protein element creates a specific response. Thus a pint of milk is capable of producing definitely higher curves both of free and total acidity and a more prolonged gastric phase, as determined by fractional analysis, than a pint of standard gruel. In practice, however, it is so inconvenient to dispense with milk that it forms a part of all ulcer dietaries, and its fluid nature and nutritional value help to outweigh the disadvantages. The soft farinaceous foods are theoretically and practically appropriate; they do not require gastric digestion or stimulate a high acidity. Fats and oils possess the important faculty of causing some actual inhibition of acid secretion; they are also lubricant and of high calorie value.

To avoid distention of the stomach, small feeds must be given. To avoid the pyloric hypertonus, which results when the stomach is empty and unopposed "acid-control" established, the feeds must be given often. Eight feeds in the day at 8 and 10 A.M., 12 noon, 2, 4, 6, 8 and 10 P.M. is a convenient distribution, though in the Sippy and similar regimens smaller and more frequent feeds are preferred. An additional feed in a thermos flask should be handy in case the patient wakes at night. The dietary may include: Benger's food, gruel made with refined oatmeal, ground rice, semolina, arrowroot, corn-flour, malted milk, cream (4 to 6 ounces daily), milk (2 to 2½ pints daily), sugar or lactose, and the juice of a sweet orange or grape-juice. In addition an occasional rusk may be given to encourage the flow of saliva, to keep the mouth clean, and to provide the pleasure of mastication. No feed should exceed half a pint in bulk, and unless the patient complains of hunger it should usually be of smaller amount—say 6 to 8 ounces. The milk can be given mainly in conjunction with the farinaceous foods; when taken alone 15 grains of sodium citrate should be added to each feed. This regimen should be followed for two weeks, and then supplemented by the addition of two eggs lightly boiled, poached, or beaten up. In the fourth or fifth week two more eggs, scrambled or boiled, thin bread and butter without crust, custards, fruit-jellies, Force, or cornflakes may be added. In cases with "duodenal hurry" more frequent feeds may be necessary, but very small feeds in these cases sometimes fail to achieve relief of pain. Smoking should be prohibited. After the first fortnight there should be a gradual gain in weight, and at no point should there be appreciable loss.

Belladonna tincture is probably the most useful drug in the treatment of duodenal ulcer. It should be given in 5-minim doses

a quarter of an hour before every alternate feed, and may be administered in conjunction with emulsion of magnesia (B.P.C.) 1 drachm to 1½ drachms. If dryness of the mouth or visual disturbance becomes troublesome, three instead of four doses in the day may be given with 2 drachms of the magnesia emulsion. The action of belladonna is antispasmodic and antisecretory. It has been shown to modify the fractional test-meal curve more efficiently than alkalies, probably by causing relaxation of the pylorus and permitting duodenal reflux. Alternating with the belladonna, and again at an interval of a quarter of an hour before feeds, one tablespoonful of the best olive oil is given. Midway between feeds, when the acidity is likely to be highest, and again at bedtime, bismuth oxycarb., gr. 15, should be taken. If night pain has been troublesome a hypodermic injection of atropine, gr. 1/100, at bedtime may also be given in the early stages. For constipation liquid paraffin is generally satisfactory, but salts or enemata may be required.

Dental or tonsillar sepsis should be radically dealt with before the intensive treatment is started, and careful attention must be paid to the hygiene of the mouth throughout. If possible radiograms of the teeth should be taken. Occasionally it may be necessary to advise removal of an infected appendix. By consultation between physician and surgeon at the time of operation the desirability of medical or surgical treatment may then be assessed after actual inspection of the ulcer.

The duration of intensive treatment should seldom be less than six weeks and never less than a month. The treatment should in all cases continue until (1) there has been no complaint of spontaneous pain for at least three weeks; (2) all reflex signs, such as "guarding" or increased abdominal reflex on the right, and deep tenderness, have disappeared; (3) the stools are found to be free from occult blood on three occasions. The benzidin test for occult blood gives sufficiently reliable results for practical purposes.

The after-treatment is almost as important as the intensive phase. When possible the patient should be sent for a holiday. During this period he should follow out the same rules, but allow himself greater liberality in the amounts of food consumed, and instead of staying in bed should rest after meals for one hour. He may cut down the number of feeds to six per diem while increasing their bulk; thus by introducing an extra middle-morning feed and a bedtime feed he can conform with the ordinary meal-times of the household. Potatoes mashed with butter and puréed vegetables may be added to his diet. At the end of two weeks' holiday a little cold boiled bacon or sardines may be taken with breakfast, and steamed or boiled fish with lunch or supper. The olive oil and belladonna should be continued. For the next three months the same principles should be followed with gradually increasing variety in the meals. These should still be made up as far as possible with milk, cream, butter, fats, and farinaceous foods, but with the addition once a day of fish or fowl. After three months a return to normal life and dietary is permissible, but with the following restrictions, which should be observed rigidly for a year and as closely as possible thereafter.

Hunger must be particularly avoided, and for this purpose biscuits or milk chocolate should be carried in the pocket and a night feed provided in case of waking. Physical and mental overstress and mental activity at meal times must be avoided so far as circumstances permit. Smoking must be moderate and only "on a full stomach." Irritating particles such as seeds, skins, nuts, and vegetable fiber must be eschewed. Condiments, meat-soups, mustard, pepper, spirits, and salted or twice-cooked meats must be avoided altogether. Meals must be taken slowly and chewed thoroughly. The dentist must be visited regularly twice a year. Fats and farinaceous foods should still be preferred, and olive oil, or in winter a cod-liver-oil preparation, taken with breakfast and the evening meal.

The treatment outlined above is not intended as a "stock" treatment applicable

in every case of duodenal ulcer, for in no condition is it more essential to study clinical and personal peculiarities. It is sufficiently simple to allow of its employment in the patient's own home, and without the supervision of a trained nurse.

The Effect of Kaolin on the Intestinal Flora in Normal and Pathologic Conditions.

BRAAFLADT, in the *Journal of Infectious Diseases* for November, 1923, states that the prompt neutralizing effect that kaolin has on toxins and toxic products of pathogenic intestinal organisms when these are treated with it, centrifuged, and the supernatant fluids injected into animals, largely explains the favorable results obtained with it in the patients suffering with Asiatic cholera, bacillary dysentery, and acute enteritis reported in this paper. It would also seem to indicate that it might be beneficial in typhoid, meat poisoning due to the enteritidis-parathyroid group, and in botulism, especially if given early in the disease.

Kaolin does not act as an antiseptic, but it "carries down with it" large numbers of bacteria in fluid mediums when mixed with them and kept in motion for two or three hours. Whether this is a purely mechanical action, or whether kaolin has some specific attraction for bacteria, is not clear. When not kept in motion it does not reduce the number of bacteria to any extent.

It combines with toxins and toxic products of Vib. choleræ, B. dysenteriæ (Shiga), B. enteritidis, B. diphtheriæ, B. botulinus, B. typhosus, B. paratyphosus B., and, perhaps, of putrefactive and proteolytic bacteria, rendering them harmless.

When taken by mouth over a period of from ten to thirty days in sufficient quantities (1 to 2 ounces per day for a man), it changes the intestinal flora of rats, dogs and men from a predominantly proteolytic type to an aciduric one.

It practically eliminates B. welchii from the stool; it does not upset digestion.

It has been used with success in Asiatic cholera, bacillary dysentery, chronic ulcerative colitis, and acute enteritis.

A Note on Fur Dermatitis.

In the *New Zealand Medical Journal* for October, 1923, WHYTE states that the present vogue of fur has been responsible for a recent outbreak of dermatitis in London of such an extent as to call for the consideration of the London Fur Trade Association and of the Home Office. The furs responsible are reported to have been of the dyed rabbit variety. The use of dyed rabbit is not confined to London, and a case that has lately come under his notice in New Zealand may therefore be of interest. He was asked to see a lady who presented a widespread erysipelas-like condition of neck, chest, and back. The skin was reddened and swollen, but not brawny, with indefinite margin, and there was an absence of constitutional disturbance. This condition extended from the scalp down to the inferior angles of the scapulæ, encircled the neck, and in front reached well below the clavicles. The fur neck-band, presumably dyed rabbit, of an imported frock, purchased eleven weeks ago, and worn intermittently since, was, he considers, the undoubted cause. When its use was discontinued, the skin condition cleared up in a few days, leaving a branny desquamation. The question of sensitization in these cases has been put forward. In the present instance there was a premonitory irritation a fortnight previously, and for a few days thereafter the frock was not worn.

Post-infusion Reaction in Cholera.

In the *Calcutta Medical Journal* for October, 1923, BANERJEE states that it is a common experience to those who have to treat cases of cholera to observe some sort of reaction in nearly all their cases of cholera after the injection of saline intravenously. The chill and rigor which one notices either during or shortly after the intravenous injection of saline are generally said to be due to reaction. Fever following the rigor occasionally escapes the attention of the physician or the attendant, being very mild in some cases.

The chill, which is rather a characteristic

feature and more or less a very constant factor, usually comes on at the later part of the intravenous injection and is sometimes regarded as an indication that the required amount of saline has been given and further introduction of saline is to be stopped. This is all the more marked sometimes when we notice that a patient gets a rigor when the amount of saline just comes to the point as indicated by the specific gravity of blood. On other occasions we find the rigor coming on much earlier, when only a partial quantity of saline has gone in. In some other rare occasions it is noticed to occur when only a few ounces have gone in, and becomes so severe that further introduction of fluid becomes impossible on account of the cessation of the flow into the vein, although specific gravity indicates a considerable amount of fluid to be infused. In some other cases no rigor is noticed until some time after the injection has been finished, and some cases show no reaction at all.

He occasionally noticed that the more rapidly the fluid is introduced the earlier the rigor appears, and may occur during the time the injection is being given and so becomes disagreeable. It usually starts in the extremities, extending toward the trunk and muscles of face and jaws. The patient feels chilly over the whole body, coming on in paroxysms. At first this chill and rigor seem to be very mild, but subsequently become very intense, often unbearable. Some intelligent patients often describe this to be more severe than the severest rigor experienced in malaria. On account of this feeling the patient doubles himself up and asks for more and more cover, but any amount of warmth fails to give him any relief or remove the chill. This generally lasts for a few minutes, very rarely for more than an hour, after which this feeling of chill gradually disappears and the shivering comes to an end. After the cold stage is over, next comes the hot or febrile stage just like malaria. After the cold stage is over the rectal temperature will show a rise, and occasionally to a considerable extent. It is not surprising to find a rectal temperature of 106° within about ten minutes after the injection has been finished. In a majority of instances the rise of temperature gradually comes down to normal, leaving the patient much more comfortable and resulting in no harm to the patient or any way interfering with the value of the injection.

The author asks, what are the factors responsible for this reaction?

1. It has been found that saline made with freshly-prepared sterile distilled water is absolutely free from reaction. But the use of distilled water from the manufacturers nearly always leads to more or less marked reaction. This is probably due to contamination of the distilled water during preservation. It may be free from chemical impurities but never from bacterial impurities, and a large percentage of the samples in the market contains fungus or other growths, and it is probable that the fungus or similar impurities in the distilled water are responsible for the reaction.

In the hospital he used tap water, which is safer than preserved distilled water as it contains very few organisms which might be responsible for the reaction. Moreover, in his series there were about 20 per cent of cases which did not show any reaction, indicating that freshly sterilized tap water is possibly not the causative factor for the reaction.

2. Relation of the chemicals used in the saline to the reaction. The chemicals commonly used were NaCl, calcium chloride, sodium bicarbonate. The formula which he has used in the hospital is as follows:

Hypertonic.

Sodium chloride, grs. 120;
Calcium chloride, grs. 4;
Aqua, 1 pint.

Alkaline Isotonic.

NaCl, grs. 60 (subsequently grs. 90);
Sodii bicarb., grs. 160;
Aqua, 1 pint.

In all the intravenous injections where more than one pint was used the patients had the first pint of alkaline isotonic followed by the remaining amount of the hy-

pertonic saline. This shows that a large percentage of patients of this series practically received all these chemicals during each intravenous injection.

From the review of these cases he finds that 11 per cent received hypertonic alone; 8 per cent received alkaline isotonic alone; 81 per cent received both hypertonic and alkaline isotonic.

Comparing the reaction of these groups separately, no appreciable difference is noticed in the grade of the reaction, except in the alkaline isotonic group the reaction is not so high as in the other group, probably because of the small amount of the solution, as more than one pint was very rarely used.

In his private practice, where he generally gives hypertonic alone, the reaction is no less than the series under review. Hypertonic saline in a large percentage of these cases contained only sodium chloride, excluding the calcium chloride, followed by similar results.

The reaction temperature may often be alarming, and it might be taken that a majority of the cases dying shortly after intravenous injection are due to excessive reaction temperature or excess of saline infused. Hence the importance of the proper management of the reaction temperature.

The proper management is to adopt measures in order to prevent dangerous reaction if possible. The best way is to regulate the saline temperature according to Rogers's method, which is as follows:

Take the rectal temperature as a routine method before every intravenous injection, more especially during the reaction stage, and where the patient had the last intravenous injection of saline only a few hours before.

If the rectal temperature is 98° or 99°, the temperature of saline will be at body temperature; if the rectal temperature is higher, the saline temperature will be lowered accordingly. Roughly speaking, the saline temperature should be as many degrees below 98° F. as the rectal temperature is higher than normal, and *vice versa*. It is very unusual to find the rectal temperature much below normal, and hence there will be very few occasions when the saline temperature should be high. He thinks as the majority of cholera cases occur in Calcutta during the summer months the saline should never be required to be warmed. Saline at room temperature is quite sufficient; moreover, if the rectal temperature is fairly high, say about 102° or 103°, the saline should be cooled instead. If the injection is to be repeated within a few hours after the preceding one, the saline should never be warmed.

In spite of these precautions, if the reaction temperature is high an ice-bag should be put over the head or sponging or cold pack or even an ice rub will probably be required.

In addition to these, in serious cases considerable amounts of iced saline or water (say two pints or so) should be given per rectum and repeated if necessary.

Treatment of Syphilis of the Nervous System.

GRINKER, in the *American Journal of Syphilis* for October, 1923, states that in interstitial neurosyphilis it is strange that the strongest advocates of the newer treatment by means of the various preparations of salvarsan still adhere to the use of mercury. The reason is evident: mercury is indispensable in the treatment of neurosyphilis. It now occupies the position formerly held by iodides. Mercury in some form occupies an important rôle in our therapeutic armamentarium against neurosyphilis, but it is especially valuable in interstitial neurosyphilis. The two methods now in vogue are by inunction and injection. The old mercurial ointment still leads in the inunction treatment, though several newer preparations have become aspirants for recognition. If only to condemn it, he mentions the internal treatment of syphilis by means of little pills containing either green or red iodide of mercury. That treatment, happily a thing of the past with most of us, was an abomination; it fooled the

patient and it fooled the doctor; the latter thought he was giving treatment and the former that he was taking treatment, when in reality he was only passing little pills through his intestines. The method of using inunction is so ancient that directions to physicians are superfluous, though Grinker has noticed that physicians often fail to give proper directions to their patients.

The method of choice in the use of mercury is the injection of either soluble or insoluble mercury into the muscles. If the patient is in a position to take daily treatments, the soluble mercury is to be preferred. However, the rule is that patients are either unwilling or unable to see a physician daily. As a consequence, we are obliged to use insoluble mercury once or twice weekly. His personal preference is for the painless gray oil, first extensively used in England and recently made quite popular in this country. The preparation is sold in filled syringes, each containing sufficient for ten injections. Injections may be given once or twice weekly, depending on the severity of the case. The usual landmark is, divide the line drawn from the upper end of the intergluteal depression to the anterior superior spine of the ilium, and inject at the point of division, introducing the needle perpendicularly down to a depth of two to three inches. The amount to be injected is about one to two grains weekly. While giving mercury, one should never omit ordering an acid-free diet, and the use of powdered chlorate of potash added to water as a mouth-wash.

While brilliant results have been achieved from the intelligent use of mercury alone in the interstitial variety of neurosyphilis, the combination of mercury by intramuscular injection with some preparation of salvarsan intravenously administered has given the best results.

In the majority of cases of interstitial neurosyphilis the combined mercury-salvarsan treatment suffices. However, in those diffuse nervous lesions that have resisted the usual treatment some form of intraspinal medication becomes necessary.

In parenchymatous neurosyphilis Grinker has recourse to the autoserosalvarsan method of Swift-Ellis, because the ordinary intravenous route gives unsatisfactory results. He does not enter into a detailed description of this method, as this can now be found in any good text-book. However, he mentions that he has not found it necessary to make a hospital patient out of every case requiring the treatment. Patients can be treated in the office or laboratory on two successive days. After the intraspinal treatment the patient is instructed to take the quickest vehicle of transportation to reach home, then to lie on his back for twenty-four hours in a bed, the foot of which is elevated about six inches. This makes an immense saving of time and money to those who can and are obliged to work. For this reason he gives the intravenous injection on Friday afternoon, the intraspinal one the next afternoon, and the patient rests in bed until Sunday noon and is ready to return to work Monday morning. The injection is repeated once weekly, and he has yet to see his first accident from the ambulatory method of giving the original or the Ogilvie-Swift-Ellis method of treatment.

The Present Position of Organotherapy.

Writing in *The Practitioner* for October, 1923, COBB points out that no paper on the present position of organotherapy would be considered complete without some reference to a subject which has stirred the imagination of the laity, even if it has not done so in our profession. He refers to testicular operations, and their power to rejuvenate the organism. A brief description of the two methods now being adopted by two different exponents may be helpful to clarify our opinions on this subject. The first method is that of Steinach. This observer has been working for a number of years upon the testicular secretions, and more especially upon the character of the internal secretions, in relation to the external secretion of this organ. His object seems to have been to prove that the internal secretion controlled sex characters; and subsequently he sought to show that the

coming of old age was to some degree due to the diminishing power of the interstitial gland—*i.e.*, the cells of the testicle which furnish the internal secretion.

In applying these theories to practice, his experiments and those of other observers have shown that the secondary sex characters can be abolished or those of the opposite sex substituted by grafting the sex organ of the opposite sex. Furthermore, he has produced rejuvenation in rats by operations designed to encourage the internal secretion at the expense of the external.

In operations upon human subjects, Steinach chose the method of ligature of the vas deferens. "By stimulating the action of the interstitial gland at the expense of the generative function, it is Steinach's idea to bring about a rejuvenation process in older people by the resuscitation and renewal of the weakening secondary characters."

The operation is performed under local anesthesia, a small incision being made and the vas deferens cut. Care is taken not to injure the blood-vessels near-by. The vesicula seminalis on that side is cut off from the interstitial gland, and this leads to multiplication of the latter gland, and, theoretically, to an increase of its secretion. The results are stated to be as follows: "The appearance of the subjects became younger, fresh, their bodily strength increased, the tremor of their hand disappeared, memory and will-power returned, and the sexual power was restored."

The second method to which he has referred is that of Voronoff. Professor Serge Voronoff, who is Director of Experimental Surgery at the Physiological Laboratory of the College of France, adopts the method of grafting. It must be emphasized that both these methods aim at the same result, namely, the amplification and stimulation of the interstitial gland. Steinach's method is to extol this portion of the testicle at the expense of the seminiferous part; Voronoff offers to the organism fresh tissue, and therefore, it is hoped, fresh hormone. His most valuable experiment, from the scientific point of view, is recorded in his book, *Greffes testiculaires*. He describes how he implanted the fragments of a testicle obtained from a young into a senile ram, which was so weak it could hardly totter. "Two months after the graft had been effected the animal was completely transformed. His urinary incontinence had completely disappeared, so had the trembling of the legs; and he no longer looked afraid. His bodily carriage had become magnificent, he behaved in a lively and aggressive manner. The old ram had taken on the appearance of remarkable youth and vigor. He was isolated in a small stable, together with a young ewe lamb, which afforded the opportunity for observing not only the awakening of his sexual instincts which he had lost years ago, but also the following more tangible result: the ewe-lamb covered by him in September, 1918, dropped a vigorous lamb in February, 1919. Old animals, like very aged men, occasionally possess spermatozoids which are altogether alive, but it is the atrophy of the internal secretive glands which prevents their experiencing the sexual appetite and manifesting their virility."

In attempting to form some opinion of the future of this work there are several points to emphasize. First, there is some period reached by the male—more indefinite, but still traceable—which is analogous to the menopause in women. It is this period—and other milestones in life—which has led to the popular belief that a change takes place in a human being every so many years. In man, this is the period in which the prostate is apt to hypertrophy; and when many small signs may be observed of a failure in adjustment of the individual to the calls made on him by his environment, calls which before he met satisfactorily. If this stage is reached early or is of sudden onset, it is more easily noted by changes in the physical side—senescence is more marked, the man stoops more, his epidermal structures degenerate, and he becomes bald, or his hair loses its color and life. Secondly, these changes have been stopped both by Steinach's and Voronoff's methods. Thirdly, the great question is, whether these

changes will prove to be—he does not say permanent—but of any considerable duration. The fact that rejuvenation is possible is an extraordinary, if tardy, recognition of that great master's contention that to the gonadic hormone we must look for the means of postponing old age. Brown-Sequard's reputation was sacrificed on the altar of rejuvenation; and if the lay press had its way so would those of Steinach and Voronoff.

Post-arsphenamine Eruptions.

In the *California State Journal of Medicine* for November, 1923, MILLER expresses the belief that the cause of post-arsphenamine eruptions is an idiosyncrasy or susceptibility of the patient to arsphenamine and is not due to the toxic properties of the drug or its mode of administration. He further claims that seborrheic dermatitis is an external sign of this susceptibility and is a warning which we should heed. He has learned to look upon all cases of seborrheic dermatitis as potential cases of arsphenamine dermatitis. He makes it a point to be sure that they are clear of the dermatitis before arsphenamine is administered. If this procedure is followed he feels certain that it will lessen the incidence of post-arsphenamine eruptions.

The external manifestations of the disease can only be treated symptomatically. No single remedy will give satisfactory results in all cases. For the milder eruptions, calamine lotion or a single dusting powder will give the best results. In the more severe cases, calamine liniment, zinc oxide ointment or Lassar's paste without salicylic acid may be used. In general, the lotions and powders cause the eruptions to involute most rapidly, but the patient will prefer the paste or ointments as they will relieve the dryness of the skin which the lotions accentuate. In the hands of some the so-called colloidal bath has given excellent results. He has had very little success with it. Stimulating medications should not be used in any form except for the localized areas of dermatitis that may persist after the involution of the generalized eruption. It should always be borne in mind that the dermatitis is an external manifestation of an internal condition. All that we can hope to do is to help the skin, with soothing applications, withstand an attack from which it is already the loser. Any therapy that is to reach the cause of the disturbance must be given internally.

In 1920, Revaut of France described the use of sodium thiosulphate orally and intravenously in the treatment of arsenical dermatitis. In 1922 McBride and Dennie of Kansas City described their experiences with this mode of treatment.

The theory is that sodium thiosulphate, a derivative of the non-metal sulphur, converts the metal arsenic into non-toxic insoluble sulphides, which are in time eliminated from the body. Whether this is what actually happens in the body is difficult to say. The interesting observation is that it greatly shortens the course of the eruptions.

Eight cases in his series were treated with sodium thiosulphate, intravenously and orally. They all showed marked improvement under this treatment. They did not, however, begin to improve until after the fourth or fifth injection, while the most marked improvement was noticed a day or two after completion of the course of treatment. This retarded evidence of improvement may be due to the fact that it takes some time for the body to repair the damage already done by the arsenic. Saline cathartics and large amounts of water by mouth tend to hasten elimination.

Sodium thiosulphate should be used in all cases of arsphenamine dermatitis that fail to improve under local treatment after a period of a week or ten days. He thinks it advisable to wait this length of time, in view of the fact that a large percentage of the cases will clear spontaneously. No toxic or disagreeable symptoms due to the drug have been experienced; nevertheless, unnecessary intravenous therapy of any kind should be avoided as much as possible. This type of therapy is adapted to those cases

classified by Stuhmer as group 3, or the chronic arsphenamine dermatoses.

The technique of administration is that of neoarsphenamine. The drug for intravenous use must be pure and must be sterile. It has been put on the market by the H. A. Metz Laboratories in air-tight, sterile ampoules, similar to arsphenamine. A pamphlet of instructions accompanies each course of treatment. In general, the injections are given at twenty-four-hour intervals for the first four smaller doses, and at forty-eight-hour intervals for the two to four succeeding larger doses. The dosage is 0.3, 0.45, 0.6, 0.9, 1.2 and 1.9 grammes respectively. It is given intravenously by the syringe method dissolved in ten to twenty cubic centimeters of sterile distilled water. This is supplemented by one gramme of the drug given orally three times a day dissolved in water.

One course of treatment, consisting of six to eight injections, will generally accomplish as much as can be expected from the drug. Many of the patients will have a few areas of dermatitis remaining after the completion of the course of sodium thiosulphate. These are generally in the distribution of a seborrheic dermatitis and clear in a few weeks, with the use of local mild antiseborrheic remedies.

Lees recommends the use of sublimated sulphur, 30 grammes three times a day, for its neutralizing effect on the arsenic. The drug given by mouth cannot accomplish the same results as the derivatives of sulphur given intravenously. It may be given in this way, however, when it is impossible to obtain the sodium thiosulphate for intravenous use.

The blood serum during an attack of dermatitis is often found to be negative, and it may remain so for some time afterwards. A recent article of Gougerot warns us of the danger of assuming that this is permanent and urges a careful observation of these cases for a number of years.

One case in his series had a negative Wassermann reaction at the time of her dermatitis. It had been strongly positive ten days previously. He was unable to observe her after the dermatitis cleared. Three other cases in which the Wassermann was taken immediately after the disappearance of the eruptions were found to have the same serological findings as before the development of the dermatitis.

Practically all of these patients remain intolerant of the drug for months or years after their arsphenamine eruptions. In the severe cases the danger of a recurrence of the dermatitis is such a serious one that it is advisable to continue the treatment with mercury and iodides. In the milder cases, if arsphenamine is to be used it should be used cautiously. Intradermal tests with a small quantity of arsphenamine solution will generally tell if the patient still has an idiosyncrasy to the drug. Treatment with mercury and iodide should not be started until all areas of dermatitis have entirely cleared.

He summarizes his paper as follows:

1. Of eighteen patients with arsphenamine eruptions, seventeen of them developed early in the course of the administration of the drug.

2. Seborrheic dermatitis in a patient seems to predispose him to post-arsphenamine eruptions.

3. Arsphenamine eruptions occur as frequently after neoarsphenamine as after arsphenamine.

4. Sodium thiosulphate intravenously and orally greatly shortens the course of the eruptions.

5. Further antiluetic treatment in the severe cases of post-arsphenamine dermatitis should consist only of mercury and iodide.

The Treatment of Hay-fever, Asthma, and Other Manifestations of Allergy.

Writing in the *American Journal of the Medical Sciences* for November, 1923, DUKE states that it does not come within the scope of his paper to discuss at length the symptomatic treatment of asthma and allied conditions, for few subjects have been more thoroughly discussed in medical literature than this.

Adrenalin is the one remedy which is relatively consistent in its effect. Other remedies, even atropine, are characterized by their inconsistency. A remedy which completely relieves one patient may have no marked influence on others. Adrenalin is our most effective symptomatic remedy, and if properly used will relieve the great majority of cases temporarily. The dose required varies—in fact, varies from 0.05 or 0.1 to 1 or 2 cc. In order to obtain the best effect the dose must be adjusted to suit the individual's need. This can be accomplished usually by giving 0.25 to 0.6 cc of a 1-to-1000 solution subcutaneously at five- or ten-minute intervals until the patient experiences relief of symptoms or symptoms of reaction to adrenalin, such as nervousness, pallor, and tremor of the hands. When the amount required for relief has been determined in this way, the total amount used can be repeated, if given slowly, as often as symptoms return. In this way continuous relief can often be obtained. After the patient has been free of symptoms for a time the dose can be reduced—in fact, can often be reduced gradually from a relatively large dose to a dose of 0.1 or 0.2 cc. Occasionally, however, this is not the case, and larger doses have to be used and continued in order to maintain relief. Adrenalin should be repeated as soon as possible after symptoms begin to return; in fact, it is well to anticipate the return of symptoms by a few minutes if this can be done.

Adrenalin gives relief in the majority of cases of asthma. It often fails in agioneurotic edema, where very large doses are frequently required. It does not give immediate relief in eczema and other illnesses where structural changes in the tissues have occurred.

Adrenalin can be used for weeks or months without serious ill effect, although, perhaps, more experience is needed before the harmlessness of this drug can be relied upon if used for indefinite periods of time. He has observed several cases in which it has been used for months with apparently no serious ill effect. While adrenalin can be used continuously for months, it is best adapted for emergency treatment and temporary treatment, and should be discontinued as soon as measures which have a more lasting effect can be instituted.

Pituitrin given subcutaneously often has an effect somewhat similar to that of adrenalin. Its immediate effect is not nearly so marked, but as a rule, if the drug is effective, it gives a longer period of relief than adrenalin. It is occasionally advisable to use pituitrin and adrenalin together, but Koessler warns against the use of pituitary extract on account of its sometimes containing histamine as an impurity.

Atropine in doses of 1/300 to 1/100 grain, given two or three times in twenty-four hours subcutaneously or by mouth, is often valuable. It can be used in conjunction with adrenalin or it can be administered alone. A dose should be used which causes dryness of the mouth, but rarely a dose which causes blurred vision or dilatation of the pupils. Often atropine in small doses marks the difference between success and failure in the relief of patients who have been treated according to the principles just outlined. A patient nearly relieved by other means often may be completely relieved with the help of atropine.

Habit-forming drugs need no detailed discussion in this paper since they are contraindicated in most chronic illnesses, especially in asthma. Emergencies which justify their use rarely occur.

To summarize symptomatic treatment, adrenalin, pituitrin, and atropine should be looked upon as useful symptomatic remedies, best adapted, however, for temporary use while the more lasting methods of treatment are being instituted.

The numerous manifestations of allergy, such as hay-fever, asthma, the dermatoses, the gastrointestinal, urological, and neurological symptoms, urticaria, angioneurotic edema, hypotension, etc., can be treated along five different lines, namely, avoidance or removal of the specific cause of

illness, avoidance or removal of contributory causes, specific protein treatment, non-specific protein treatment, and symptomatic treatment.

Avoidance or removal of the specific cause is the method of choice when this method can be used.

Specific protein treatment is the method of choice when the specific cause of illness is known, but cannot be conveniently avoided, namely, in the case of sensitiveness to the common fall pollens and to cooked egg, milk, or wheat.

When the specific cause of illness is not known or cannot be removed or treated specifically, non-specific protein treatment is worthy of trial. This can be accomplished best, he believes, through the use of colon bacilli subcutaneously or in very small doses intravenously.

Finally he reiterates that adrenalin, pituitrin, and atropine are useful symptomatic remedies well adapted for emergency use and for temporary use while the more lasting methods of treatment are being instituted.

The results of pollen therapy in the treatment of pollen hay-fever and asthma are good. The best results are obtained through the use of pollen extract subcutaneously, combined with local applications of pollen extract to the conjunctivæ and nasal mucous membrane.

Germanium Dioxide as a Remedy for Anemia.

MINOT and SAMPSON, in the *Boston Medical and Surgical Journal* of November 1, 1923, state that it seems from the observations summarized above, as well as those recorded by others, that germanium dioxide may induce a transient increase of the red-cell count of the peripheral blood, but there is no evidence that it is a powerful erythropoietic stimulant.

There were no indications that any of the four cases with anemia showing the transient abrupt red-cell elevations improved faster or were influenced more beneficially than many other cases which they studied of the same types but not receiving germanium.

No evidence has been obtained suggesting that germanium dioxide has the power to increase blood formation or that it exerts any significant effect to improve the health of anemic individuals. Consequently the drug seems to be of no value in the treatment of anemia.

As their paper went to press they noted the appearance of an article by Alexander in the *American Journal of the Medical Sciences*, 1923, 166, 256, entitled "Observations on the Action of Germanium Dioxide in Pernicious Anemia." Alexander observed no clinical improvement or increase of hemoglobin or erythrocytes in three cases of pernicious anemia following the administration of germanium dioxide by mouth and hypodermic injection of about 5 grammes in the course of three to four weeks. In each case the germanium was administered at the rate of 100 mg. per kilo of body weight.

Rubber Gloves and Iodine Demand Their Rights in the Delivery Room.

Writing in the *Canadian Practitioner* for November, 1923, NATHANSON says that to those of us who have had the opportunity of serving as internes on a surgical service, it is both enigmatic and difficult of conception why we are so careful in our technique, and justifiably so, in undertaking such a minor operation as incision of a breast abscess, as compared to our attitude when we are called upon to deliver a woman in labor—an inestimably greater and more serious procedure, which we do not usually undertake with the care and precision to which it is entitled and for which our patient has engaged our services.

Why the parturient female should not be regarded with as much respect as is the thyroidectomy case, or the surgical patient demanding entrance into the general peritoneal cavity, has at all times seemed to me a mystery. In the one case the operator

is constantly on the lookout for the abolition of all possible precursors of infection, whereas in the labor room this lookout is usually limited to a short scrub-up, and then the practitioner is prepared, in his own estimation, to perform a forceps operation or even such an important obstetrical procedure as an internal podalic version.

It is certainly not due to his ignorance of the existing conditions with which he has to contend, and their possible resultant ill-effects; but rather to a customary and pernicious practice which is usually carried out by many of us in our obstetric cases. The following he thinks is a short but unbiased description of the usual *modus operandi* just prior to actual delivery. We are called to see our patient. In many cases we do not even attempt to clip the pubic hair, already a fertile avenue of infection, let alone shave it. Added to this neglect is a short scrub-up, usually limited to soap and water, not timed by the clock, but according to our convenience, and associated with a so-called immersion in a weak antiseptic solution. Then follows an internal vaginal examination, accompanied by an ingress into the vagina, and perhaps already dilated cervical canal, of the bacterial flora so constantly present on the external genitalia; and then on the third day postpartum we wonder why our patient complains of an indefinite symptomatology and shows a rise in temperature sufficiently high to place her in the morbid class. We must regard every rise in temperature, however slight, above the normal arbitrary limits, during the puerperium, as practically always due to infection, whether it be of a mild, moderate, or severe character.

He does not feel inclined to subscribe to the usual statement to the effect that "it is probably due to her bowels," or something of that nature. It has been too often demonstrated conclusively, on large series of cases, that failure to move the bowels *per se* cannot be put down as a cause of an elevated temperature in the puerperium. It must be due to some source of infection. Granted, therefore, that our contention is correct, are we not justified in ascribing this infection, if not wholly at least in part, to an improper and inadequate aseptic preparation of our patient and careless technique on our part?

Admitting, therefore, that our usual *modus operandi* is at fault, how can we improve it with the greatest possible safety to the patient and with ultimately obtaining the maximum of good results? The answer lies in a more adequate and more carefully applied technique, and with a feeling that the parturient female is a patient who is entitled to as much, if not more, care than is the most serious patient passing through a major operation. Not until we regard our obstetrical patients in this light can we hope to obtain the desired reduction in morbidity and mortality in our obstetric practice.

Having demonstrated that our technique is still subject to criticism, it behooves us to suggest what changes should be made and what procedures should be regarded as the minimum standard in our routine when delivering a case in labor. He makes no mention in detail of proper prenatal supervision, which should include a careful physical examination, systematic blood-pressure observations at frequent intervals, careful pelvimetry, etc. These, of course, are beyond the scope of the present discussion, which is limited to a constructive criticism of our intrapartum conduct and technique, with suggestions for their improvement.

Without entering into a detailed description of the so-called wet preparation, which consists essentially of scrubbing with soap and water, followed by the pouring of various solutions from pitchers over the abdomen and thighs, Nathanson enumerates those objections which seem sufficiently worthy to stamp this method as less preferable to the one he describes and recommends.

No matter how careful the nurse or assistant is in scrubbing the various regions, soap-suds containing the mixed and accumulated filth that lies upon the skin of the

thighs, abdomen, pubis, vulva, and ischiorectal regions, sooner or later find their way into the gaping vagina. Then, as if to add insult to injury, the water, which is next poured from above, acts as a reënforcing agent to cause the ingress into the birth-canal of macerated epithelial cells, hair, fecal particles, bacteria, etc. If one considers for a moment how convenient it is for these infecting agents to find their way into the vagina and lower portion of the uterine cavity, from the very position and slope which the vaginal canal assumes with the woman lying on her back, then we must agree that the wet scrub-up is, after all, open to criticism and improvements.

For the sake of comparison, let us critically examine and valuate the dry method of iodine preparation. Having administered an enema, whenever possible, in the first stage of labor, and having shaved the pubis and surrounding regions, the anal region should be carefully cleansed, a clean vulval pad applied, and the patient not disturbed until the advent of the latter part of the second stage, when she is almost ready to be delivered. Employing ether or benzine as a cleansing and softening agent, the vulva should be painted with three and one-half per cent tincture of iodine, which should extend well over the mucous membranes, with particular attention devoted to the spaces and crevices around the clitoris, followed by a similar painting over the pubis, lower abdomen, inner sides of the thighs, and finally the perineal region, the buttocks, and the anus. This simply and readily applied procedure, which does not consume more than a few minutes, is within the reach of every practitioner. The patient is then draped with sterile sheets and towels, in such a manner as to expose only those surfaces and regions which have been previously iodized. The occasional complaint which the patient may make of burning passes off very quickly, without any deleterious effects, in his experience. It must be admitted that the above method is simple, safe, and efficient.

As to the advisability of wearing gloves, and as to their value and efficacy as the principal adjuncts to a properly performed aseptic technique, none, he is certain, can take issue. The objection occasionally raised is that the tactile sense is somewhat reduced. This is certainly not true if one will employ gloves even if only for a short period, at the end of which time the finger will have become sufficiently educated to feel the tissues accurately, and to interpret the findings by tactile palpation correctly. There is no doubt whatever that the rubber glove has done more to save lives than any other single surgical appliance, and if we are able to perform the most delicate of abdominal operations with gloves, there is no reason why we cannot employ them as part of our routine in the delivery room.

Anesthesia for Children.

SINGTON, in the *British Medical Journal* of November 3, 1923, states that no severe shock or strain to the central nervous system of a child should be lightly undertaken. Our art should ever be gentle and human; our aim with all our patients should be to make their memories of operations and similar awesome procedures as pleasant as possible. Some degree of apprehension unfortunately is a necessary preliminary to operations; and this exists in the child's mind, often at a surprisingly early age. In the child, happily, it is usually a simple fear of pain, and the feeling is usually allayed by means of tact and that quality which can only be described as "child understanding." Every one knows what splendid patients children make so long as they approve of us, and so long as they are not asked to suffer discomfort unreasonably. Always explain. Never deceive.

It has been Sington's unfortunate lot to see many children who have suffered severe shocks from the terror due to a rough administration of an anesthetic, or to an operation performed under "deceptive persuasions" rather than a properly administered anesthetic. He believes that many of

those children will have suffered permanent nervous damage, and certainly they will never again trust any one approximately resembling a doctor. The blessed gift of unconsciousness should never be needlessly withheld from any of our patients. Although there is considerable nervous shock involved in the reception of an anesthetic he makes a few suggestions which with tact and skill will reduce this to a minimum. Gentleness and understanding are the most necessary of all the possessions of a child's anesthetist. A small child, unless frightened, is a most reasonable individual, and will accept and appreciate suitably worded explanations of the things that are about to be done to him. He should not have the initial fright, when entering the room or theater, of seeing the surgeon's instruments exposed on his table. Sington warns against acceding to the oft-expressed wish of the parents to give the anesthetic to the child in bed, and carry him to the operating-room when he is under. It is a most dangerous proceeding, and should be avoided.

The child is not to be in the room until the surgeon's instruments are ready and all is prepared for the operation to begin. Let the surgeon do the waiting.

When the child is in the required position, one should coax, not force him under. A balloon may be exhibited, which he may be told can be blown bigger, and so he will be persuaded to blow vigorously. And tell him that by his effort of blowing he will blow the nasty stuff away; for while concentrating his effort to blow the inspiratory action will pass unnoticed so long as the ether is slowly administered. Put five to ten drops of essence of orange on the face-piece, covered with twelve to sixteen layers of gauze, and tell him it smells of oranges. This essence of orange is made with alcohol, and in half a dozen breaths (between the "blows") will partly anesthetize the soft palate. Then slowly drop the ether on, drop by drop, holding the face-piece quite six inches from the face, the end tilted below the chin. Do not hurry the early administration. Go slowly until the child is unconscious, then push the anesthetic further by saturating the gauze with ether. Always and at all times have a free airway. So long as the jaw is forward and the tongue not back one can hear by the free easy breathing that the airway is good. And so long as the airway is clear the color must be right.

It must, however, always be borne in mind that the child's air-passages are small compared with those of the adult. On this account there is a smaller margin for error when anything tends to obstruct those air-passages. The slightest obstruction to a free airway tends to make the child cyanosed, which means the right heart is being distended, and this cardiac embarrassment is a real danger. So the importance of maintaining a free airway cannot be exaggerated. Sington maintains that the sudden death of a child during, or immediately after, open ether administration is generally (if not always) due to the heart strain that has accrued during some part of the operation secondary to an insufficient oxygen intake.

A few points which he mentions to render the child's recovery from anesthesia less unpleasant are the following:

A drop of oleum ricini in each eye. The eyelids are so dry and the suffusion of the conjunctiva so evident after lengthy administration of ether that conjunctival trouble is not unknown, and this will be prevented by the use of this oil. It should only be used after the ether administration has ceased, because otherwise an ethereal oil will be formed which is itself damaging to the conjunctiva.

The dryness of the mouth so frequently complained of may be prevented by sponging out the mouth with normal saline immediately the administration has ceased. This is particularly necessary after operations about the mouth—for example, tonsils and adenoids—when it is the coagulated blood on the tongue and palate which, when left, is the source of annoyance to the child, and can be obviated by this means.

The highly strung, nervous child will recover from the anesthetic more quietly, and have a longer sleep after consciousness has returned, if a rectal sedative is given. For a child of ten years, potassium bromide 20 grains and aspirin 10 grains, in half a pint of normal saline, should be given slowly per rectum before consciousness returns, as soon as the child is put back to bed.

Sington's object has been to draw attention to these practical points in the hope that his fellow practitioners may be enabled to help their little patients to take an anesthetic with safety and with as little unpleasantness as possible.

House Dust in Asthma.

MEYER, in the *Atlantic Medical Journal* for November, 1923, states that in the more recent work on asthma, it was quickly realized that the responsible agent in most cases was inhaled. This was known to be true of pollens and dandruffs. The atopen or specific substance was in the dust inhaled by the patient. If the patient failed to react to the known isolated atopens, it was thought that perhaps he would to the hypothetical atopens still remaining undiscovered in the dust in his environment. This was first demonstrated to be true by Cooke. The search for the specific substances in the house dust which caused trouble led to the isolation of many new atopens, such as those associated with rabbit hair, goat hair, pepper, etc. However, there still remain many patients who react to none of the specific isolated atopens, but do react to the atopens in the heterogeneous mixture, house dust, and this fact has served as the basis of diagnosis and treatment of the group of cases he reports from the records of the Department of Applied Immunology at the Jefferson Hospital in Philadelphia. What factors still remain to be isolated from house dust we do not know; but he hopes to be able to report soon the result of studies now going on.

The method used in demonstrating hypersensitiveness in a patient is the intradermal injection of 1/100 to 1/50 cc of an extract of the suspected substance. Positive reactions are indicated by the appearance of an urticarial wheal at the site of injection. He does not believe that the scratch method of Schloss or the use of extracts other than those made by the method of Coca yield satisfactory results, and this view is supported by the experiences of Brown, Larsen Alexander and Paddock, and Vander Veer.

During the years 1921 and 1922, 338 cases presented themselves for atopic study at the Jefferson Hospital Clinic. Of these, 235 were proved asthmatics, and a tabulation of the atopens of etiologic importance in these cases is presented below. The asthmatics representing pure pollenoses were excluded.

	Cases.	Per cent.
Single sensitization	96	40.9
Danders	14	5.96
Horse	3	1.27
Cat	2	0.85
Dog	1	0.42
Feathers	8	3.4
Orris	4	1.70
Cereals	1	0.42
Pepper	1	0.42
Egg	1	0.42
Flaxseed	1	0.42
House dust	74	31.5
Multiple sensitization	74	31.46
Danders	52	22.11
Horse	14	5.96
Cat	8	3.40
Feathers	17	7.22
Dog	7	2.97
Rabbit	2	0.85
Goat	4	1.70
Orris	11	4.67
Cereals	18	7.66
Pepper	5	2.12
Egg	1	0.42
Pyrethrum	3	1.27
Tobacco	5	2.12
Flaxseed	1	0.42
Mustard	1	0.42
House dust	60	25.5
Not Diagnosed	65	27.63
Insufficient observation	46	19.56
Failures	19	8.07
Total number of cases	235	100

Of the 235 cases studied, the relative unimportance of the food factor is emphasized. The atopens of dust, however, are seen to occur as the sole factor in 31.5 per cent of cases, and in combination with other atopens in 25.5 per cent. In 57 per

cent of his cases, therefore, the atopens of dust appeared to be a primary factor in causing asthma.

The dust extract used in testing was either stock or from the patient's own environment. Stock dust extract was made of a mixture of a number of samples of dust, the extracts of which had yielded a marked skin reaction. Many patients, especially those that baffled them, were tested with extracts of dust from their own home or place of work. The dust was collected by broom or cleaner and extracted by the method of Coca in buffered normal saline solution to which a preservative had been added and sterilized by Berkefeld filtration. In all, 61 individual dusts were tested. Of these, 6 were negative and 55 positive. In three of the negative cases, stock dust reactions were positive, and in three cases both individual and stock tests were negative. Of the 55 positive reactions obtained with extracts of dust from the patient's own environment, 42 equaled stock dust, 11 reacted more strongly than stock dust, and in 2 stock dust yielded the more marked reaction. It can be stated, then, that in the majority of cases a good stock dust extract yields as marked a reaction as an extract from the patient's surroundings.

The ideal treatment of a patient hypersensitive to house dust consists in the removal of the cause, namely, the offending dust. Though this is difficult of complete attainment, assiduous efforts are rewarded with proportionate relief. Measures to be employed include the removal or frequent cleansing of dust-catching articles of furniture and floor covering. To supplement these efforts to remove the offending factor, hypodermic injections of house dust extract are given in an endeavor to hyposensitize the patient. The initial dose is 1/10 cc, and is increased 1/10 cc weekly until a maximum of 1 cc is reached. This dose, 1 cc, is repeated at intervals of one week. As improvement occurs longer intervals may be justified, for in some cases monthly injections suffice to hold the patient hyposensitized and symptom-free.

The results of treatment are briefly summarized as follows: All cases diagnosed as sensitive to atopens other than house dust showed improvement, if treatment was continuous: 21.7 per cent were symptom-free, 56.5 per cent showed considerable improvement, and 21.7 per cent slight improvement. These results are much more favorable than those obtained in the cases in which house dust, either alone or with other atopens, was involved. Of the dust cases that remained under treatment for a satisfactorily continuous period, 62 per cent showed considerable improvement, 30 per cent slight improvement, and 8 per cent no change. It must be borne in mind that these figures exclude the 28 per cent of undiagnosed cases. The percentage improved of the total number reporting to the clinic, including the undiagnosed, was 58.2 per cent. However, he feels that he may justly exclude those cases that failed to remain under observation until diagnosed, or, if diagnosed, were careless in attending the clinic. Persistence in treatment is necessary to accomplish the best results. The patience of all concerned is often taxed severely. Definite improvement may not occur for a month or two, while the maximum benefit may be deferred for several months. Meyer has used in routine treatment the stock dust extract if it gave a good reaction. The use of an extract from the patient's own environment is indicated if the stock dust reaction is weak, if no positive reactions are obtained, and if treatment is not attended with good results. There is little to choose between stock extracts and those made of the dust in the patient's surroundings if both elicit equally marked reactions.

Supplemental treatment directed toward the removal of the secondary etiologic factors must be employed. Operative procedures to correct nasal pathology, vaccine therapy, removal of foci of infection, and incidental medical care, are measures to be utilized when indicated, and their judicious application is often attended with gratifying results.

Strophanthus Kombe.

In *Minnesota Medicine* for November, 1923, MORRIS recalls the fact that strophanthus is a cardiac stimulant and a diuretic analogous in action to digitalis. While more effective in increasing the force and lessening the rate of heart action, it does not constrict the blood-vessels. As a result it facilitates the treatment of impaired circulation due to a weakened myocardium, without its effect being antagonized by marked contraction of the blood-vessels. It is less liable to cause nausea and gastro-intestinal disturbances than digitalis.

He asserts strophanthus is of great value in shock and collapse and threatened syncope. In the convalescence of children from myocardial and endocardial invasion, with kidney involvement; in senile heart patients with great dyspnea; in lung stasis and especially pneumonia, and in chronic kidney lesions, the results are better than with digitalis. It may be considered a drug that can be generally used where digitalis is indicated and not feasible.

The physiological effects are: increased myocardial tone with lowered heart-rate, diminution of dyspnea and palpitation, and increased kidney action due to the increased flow through the renal vessels.

The tincture is the only form that may be safely administered by the mouth. It may be given in doses of 0.3 to 0.6 cc (5-10 m.). The majority of cases do not assimilate the drug readily from the gastro-intestinal tract. As it rapidly disintegrates, one must constantly be on guard for the case that gives intense response to the smaller dose. Hence the minimum dose is preferable at first, with increase in a couple of days if there are no indications of over-action.

As strophanthus action is similar to that of digitalis, the previous administration of digitalis must be taken into consideration. The tincture has been given by inhalation with definite action. The tincture may also be used hypodermically or intravenously in one- to three-minim doses by first slowly evaporating the alcohol and diluting with decinormal saline.

True strophanthin Kombé used hypodermically produces little irritation, whereas the crystalline forms, or those of the substitution forms, are generally painful for some time following the injection.

The best results with strophanthus are obtained with the smaller doses of the true glucoside strophanthin, giving to the average adult hypodermically one five-hundredth of a grain (0.00013 gm.) to one two-hundred-and-fiftieth of a grain (0.00026 gm.), one dose a day (or in emergency three doses); this for three to five days, then an interval of several days and another series. In shock, recovery is more prompt with the smaller doses. In fibrillation of the auricles strophanthus is a wonderful drug. General improvement, lowered ventricular rate, less edema and dyspnea, improvement in kidney action follow its use. The tincture was used in a number of cases; improvement was marked but less spectacular than with strophanthin Kombé.

In cases of asthenia with toxic myocardial factors, with the elimination of the pathology the use of the tincture, or better, the strophanthin by hypodermic injection in small doses, is a valuable adjunct.

In cardiovascular diseases of childhood following contagious diseases, one seven-hundred-and-fiftieth of a grain (0.00008 gm.) or less on alternate days produces marked improvement. Senile individuals, including those suffering from cardiorenal disease, show increased myocardial tone, loss of edema, and general improvement on the small daily dose. Strophanthus in small doses has given excellent results in pneumonia, even during the early processes, especially where the use of digitalis was not feasible. In chronic valvular heart disease with high blood-pressure, the use of strophanthus in small doses gives excellent results.

Morris adds that the available forms of the true Kombé drug are the hypodermic tablet of strophanthin (Burroughs, Well-

come & Co. of London), rapidly soluble, causing little irritation, and the aqueous solution in a sealed hard glass ampoule of strophanthone (Parke, Davis & Co.). Both houses also supply a reliable tincture for oral use. Finally, to secure strophanthus results, we must be sure he has strophanthus Kombé with the name of a reliable firm. It is one of the digitalis family; if it or another member of the series has been used, exhibit smaller doses to avoid toxic symptoms. Keep within the therapeutic range. Smaller doses produce better results than doses bordering on the toxic side.

Intravenous Iodine in the Treatment of Septic Wounds.

MUKHERJEE, in the *Indian Medical Gazette* for November, 1923, states that encouraged by reports of successful cases in the *Gazette,* he had recourse to intravenous iodine medication in the treatment of septic wounds and found it very efficacious in bringing about a speedy recovery.

His first case was a Mahomedan girl of ten, an inhabitant of a village four miles away from his dispensary, who while out buying something from the nearest shop was attacked on the way by a rabid dog, in consequence of which she fell down and was badly mauled in the face, with the production of the following wounds:

(*a*) A lacerated wound tearing obliquely the left half of her upper lip into three pieces, the central one being very small and difficult to unite.

(*b*) A vertical wound splitting the integument covering the nasal septum into two.

(*c*) A small penetrating wound reaching the interior of the nose at its root, just below the forehead.

(*d*) A slight laceration below the right lower eyelid near the inner angle.

The girl sustained the injuries at 10 A.M. and was brought to him at 4 P.M. Considering the gravity of the injuries inflicted with regard to the disfigurement which would result, especially in a girl of that age, and bearing in mind the prime importance of sending each and every patient for antirabic treatment, he referred the case to the Sadar Hospital, but the guardians of the girl refused to send her, and he was reluctantly compelled to take her for treatment.

Although several hours had elapsed after the injuries, and as the wounds were lacerated and their edges ragged, he anticipated that they would become septic, especially the labial wounds, which were sloughing and exfoliating. Notwithstanding this he sutured the edges after preliminary thorough washing with strong carbolic lotion and free application of tincture of iodine. The wounds were then sealed with tinct. benzoinæ co., covered with cotton-wool, and firmly bandaged.

The cutaneous injury in front of the nasal septum healed by first intention, whilst the wounds on the lip in one place and those at the root of the nose showed pus, but healing took place steadily on dressings with hydrogen peroxide, tincture of iodine and benzoin. She ran no temperature and the recovery was uneventful. The disfigurement of the lip is very slight, the scar which was left being unavoidable under the circumstances. One-half cubic centimeter of B. P. tinct. iodii was administered intravenously, undiluted, daily for the first four days, then on every fourth day up to the second week, and subsequently twice a week for the remaining six weeks, during which the patient was kept under observation for the appearance of hydrophobia, the signs and symptoms of which fortunately never appeared.

The second case was an adult Mahomedan of the same village injured by his own horse, which had been bitten by the dog referred to in the previous case and which also went mad. It bit its master, inflicting a severe lesion on the ball of the left thumb.

The patient came to him on the following morning for treatment. As the wound was septic he cauterized it with pure carbolic acid and later dressed it daily with

iodine and boroiodoform. The patient was put on to intravenous iodine treatment on the same lines as given in the first case, and made a splendid recovery in about a week.

It was in the latter part of November, 1922, that the first case was brought to the dispensary, whilst the second came to him in the middle of December of the same year for treatment. A full six months have elapsed since then, and both patients are progressing favorably and have shown no evidence of hydrophobia.

His object in publishing the cases is to bring to the notice of readers the efficacy of intravenous iodine in the treatment of septic wounds.

Surgical and Genito-Urinary Therapeutics

Treatment of Acute Salpingitis.

BOURNE (*British Medical Journal*, Sept. 8, 1923) in a discussion of this subject notes that a patient suffering from acute salpingitis has acute pain, tenderness, and rigidity of the hypogastrium, with the ordinary accompaniments of moderate fever. A little later there is distention of the lower abdomen with constipation, sometimes vomiting, and painful micturition. In addition there are uterine hemorrhage, leucorrhea, and great tenderness on vaginal examination. No definite swelling can be identified during the first few days on account of the softness of the enlarged tube and the pain of examination. It is essential, however, to diagnose the presence of free pus in the pelvic cavity during these earliest days before a definite tubal swelling has had time to form.

The cardinal lesions requiring treatment are: (*a*) suppurative inflammation of the tubes, and later the ovaries; (*b*) suppurative pelvic peritonitis. These two conditions are inseparable and cannot be regarded independently.

The first object, therefore, of any intelligent treatment must be to arrest the acute disease and prevent its extension to the abdominal cavity proper. It is seldom that a general peritonitis arises as a result of acute salpingitis except after full-term labor, when the tube is an abdominal organ; but if the disease is treated efficiently it is possible to cut short the long-drawn-out course of tubal and pelvic suppuration which occurs when treated by expectant methods.

The second object is to prevent the formation of chronic sequelæ in the shape of adhesive pelvic peritonitis, interstitial salpingitis, pyosalpinx, etc. Too little attention is paid to this aspect of the disease. It is virtually impossible for a suppurative salpingoperitonitis to resolve unless operated upon. Chronic thickenings, adhesions, and cold abscesses are the almost inevitable result, producing a chronic semi-invalidism with relapses of acute symptoms. Further, a bilateral salpingitis is certainly followed by sterility.

The third object of treatment is to enable the affected tube to resolve sufficiently to resume its normal function. Suppurative salpingitis, by its denudation of epithelium and formation of intratubal adhesions, in addition to sealing of the abdominal ostium and fixation by intratubal adhesions, insures the future sterility of the patient, which is a serious matter for a young married woman affected by gonorrheal salpingitis soon after marriage. It should be our aim, then, not only to prevent chronic ill health, but, if possible, to give back the reasonable hope of conception.

The employment of expectant and medical methods will usually result in the acute symptoms passing off and the subsidence of any inflammatory mass in the pelvis. The patient "recovers" and is able to get up in about three weeks and resume her ordinary occupations; but she is inevitably

sterile thereafter, and the slow development of chronic salpingo-oöphoritis or pyosalpinx is only a matter of time.

The ideal is to arrest the destructive inflammatory process at the earliest possible moment. As we have seen, the desquamation of the tubal epithelium and the formation of the intratubal adhesions and diverticula and the sealing of the ostium comprise the essential damage from the functional point of view, and it is probable that these processes begin very early in the disease. The chief element in the tube is its ciliated epithelium, for on its integrity depends the function.

It is important, therefore, to operate as soon as possible—in other words, as soon as the disease is diagnosed as a suppurative salpingitis. The sooner the abdomen is opened the easier it is to restore tubal function by arresting the destructive suppurative processes.

The chief objections to operation during the acute stage are (1) that it is usually "unnecessary"; (2) that it may be dangerous in spreading infection. It is stated that laparotomy in the acute stage is dangerous inasmuch as it is liable to spread infection into the general abdominal cavity. By an ordinarily careful technique this should be no more likely than in acute appendicitis.

Bonney, writing on the same subject, states Bell believes and teaches that should the evidence, when sufficient is accumulated, show that complete recovery of an inflamed tube is not uncommon, then the acutely inflamed tube must be conserved whenever possible. Conservation may be practiced by (1) not operating at all, or (2) conservative operation, either by simple drainage of the pelvis or by slitting and drainage. Since it is very rare in delayed operations to find the tubes in a condition suitable for conservation, the choice would be between not operating at all and early operation with simple drainage or slitting and drainage.

Early operation has the great advantage over expectant treatment that the ovaries can always be conserved, whereas by withholding the surgeon's hand, though a proportion of the patients eventually appear to recover their health entirely, in the remainder the ovaries become hopelessly disorganized by suppuration or cyst formation, and eventually the unfortunate woman has to undergo double salpingo-oöphorectomy.

Natural cure of a pyosalpinx or an ovarian or pelvic abscess is usually effected by adhesion to the pelvic colon with discharge of the pus into the bowel. Relief, however, is not immediate as a rule, for there are generally two or more collections of pus, and, moreover, the abscess cavity at once becomes analogous to a blind internal fistula with fecal infection of its wall and contents, so that prolonged suppuration with intermittent discharge of pus per anum is not uncommon. In delayed operations the surgeon frequently has to dislodge a tube or ovary which has already perforated or is on the point of perforating into the bowel, with the result that a fecal fistula up the drainage track develops within the first few days. This is another important objection to delayed operation and a valid reason in favor of surgical interference at the earliest possible moment. Finally, as a reason for immediate operation, there is always the possibility of faulty diagnosis. There are cases of pelvic appendicitis, diverticulitis, and also early extrauterine gestation, which it is impossible at the outset to distinguish from salpingitis.

Whereas the gonococcus remains localized for a long time in the mucosa of the tube, and in time may lead to the destruction of it with the formation of granulation tissue, the streptococcus, on the other hand, has a faculty for passing rapidly through the lining membrane, without permanently injuring it in a majority of cases, and reaching the lymphatics. In consequence the tube often recovers entirely or to such an extent that a salpingostomy is not required until the acute stage has long subsided. That operation during the acute stage or even subacute stage of streptococcal infection is dangerous. Whether this is secured by non-interference and medical treatment, or whether by incision and drainage of the tubes, the essential consideration

is that the tubes should not be sacrificed. Although they are damaged by acute salpingitis they still have a real conceptional value. The closed ostial end can be reopened, the kinked and stenosed lumen recanalized, and the patency of the tubes once more established.

Oldfield stated that the only advantage he could see of early operation was that an inflamed appendix might occasionally be found to be causing all the trouble. Possibly, too, if only one tube were diseased early operation might prevent the other tube becoming involved. His experience of the later cases was that, except in tuberculous cases, fecal fistulæ were very rare. Certainly most patients got well after single colpotomy. He would certainly try earlier operation, but he was not at all sanguine as to the results.

Johnstone held that in acute salpingitis it was necessary to bear in mind that they were not dealing with disease of one hollow organ, as in appendicitis, but with disease which involved the whole generative apparatus. In slitting the tube they were only dealing with part of the disease. The bad results following treatment of the tube were not so much due to the damage to the tube alone, but to the general damaged condition of cervix, endometrium, and ovaries. He thought that there was a slight danger to life in operating on acute cases, small though it might be. The slight additional trauma of the operation might be sufficient to turn the scale and set up general septicemia. There was a real danger, too, that trauma might extend the local spread of infection. Drainage was certain to produce adhesions. If the source of infection could be got rid of he believed that adhesions would disappear, but if all sources of infection were not removed adhesions would persist. How could secondary infection down the drainage channel be avoided if the infected tube were drained. The great difficulty with all gonorrheal infections was that at an early stage they became mixed infections, and it seemed to him that they were courting the same result in draining the tube. Again, a persistent drainage fistula might occur which was exceedingly hard to cure. At present what was wanted was proof that early operation was more beneficial than the old-fashioned medical measures. He was not yet convinced that the results of early operation were really better. It was true that pregnancy did not occur after the older methods of treatment, but was there any evidence that it had occurred after the new methods? He asked for how long had drainage to be carried out, and how many cases came back later with ventral hernia.

The Treatment of Chronic Bone Abscesses.

In two earlier publications BRICKNER discussed the pathology of chronic bone abscesses and their diagnostic features, and described his method of treating such abscesses, small or large, by mere evacuation through a drill hole.

Under nitrous oxide narcosis an incision is made through the skin and the underlying muscle if any is split, or retracted, to expose the periosteum. Through this and into the bone, at a point determined by roentgenogram or by the level of maximum tenderness, a drill about one-fourth inch in diameter is driven deep enough to permit the escape of pus. The drill is then removed and nothing else is introduced into the bone—no probe, curette or gauze packing. A culture is made from the pus to determine what, if any, living organism it contains. A smear is also stained and examined at once. A small drain of folded rubber dam is laid in the soft parts down to, but not into, the opening of the bone, and the wound is otherwise closed by sutures. A simple gauze dressing completes the operation.

The drain is to provide for any further escape of pus from the bone, and to act as a safety-valve in case of possible suppuration in the bone cavity or the soft parts caused by dormant organisms awakened to activity. It is removed, usually without re-

placement, in three or four days—*i.e.*, as soon as discharge has practically ceased. The small opening in the soft parts is then allowed to close, and, ordinarily, healing of the entire wound is complete in ten days or less, but few of which usually are spent in bed. Brickner contrasts this with the prolonged disability and invalidism, the scarring and deformity, of wide-open osteotomy and slow "healing from the bottom," with its inherent risks of sequestrum formation and secondary operations.

The method is based on the conception that chronic bone abscesses tend to become sterile and afebrile. Brickner has believed, however, that this procedure will also prove successful in some, at least, of those cases of chronic bone abscess in which clinical signs—daily mild elevation of temperature, slowly increasing pain and tenderness—indicate that the pus is not sterile, but that the virulence of the organisms is slight. He had previously reported such a case. In the present communication he shows, by two further cases, that complete sterility of the pus is not essential to the success of his method of treating chronic bone abscess.

The first case was that of a cortical abscess in the right tibia metastatic from a subsiding osteomyelitis of the left femur and tibia. The second case was that of a large medullary abscess in the right humerus of a syphilitic child who several years before had had acute osteomyelitis of the left tibia. Both were promptly cured by simple evacuation of the pus through a small bone opening, although in both cases the pus showed staphylococci on culture. In the first case smears showed a few gram-positive cocci; in the second case smears showed no organisms.

An abscess in the bone substance (corticalis) usually shows clearly in the roentgenogram, but an abscess within the medullary canal usually cannot be recognized as such, roentgenographically. The *x*-ray appearance then is that of the associated osteoperiostitis, by which the abscess can be diagnosed only in connection with the clinical signs—pain and tenderness.

While in all of the cases of bone abscess in which Brickner employed simple drainage through a small drill hole, immediate relief and early and therefore permanent healing were secured, he is prepared to believe that this will not always happen. It is conceivable that as the result of introducing a secondary infection or of the awakening into activity of dormant organisms suppuration may continue and require further operation. Even accepting such a possibility, however, there is much to be gained and little to be lost by a trial of this simple minor operation. The procedure is curative not merely in chronic sterile bone abscesses, but also in those chronic (and subacute?) bone abscesses in which living organisms are still present but not virulent. The method is not recommended for acute pyogenic bone infection with high fever.—*American Journal of Surgery*, September, 1923.

Gangrenous Balanitis the Fourth Venereal Disease.

Cross and Zevalkink *(Urologic and Cutaneous Review*, September, 1923) find this infection is due to a symbiosis of a vibrio and spirochete and note that in private practice it occurs in about one out of five hundred cases.

The patient usually presents himself with a history of sexual intercourse followed in a day or so by an itching and burning pain in the preputial sac. The penis is tender and the foreskin is somewhat reddened and edematous. The discharge is not profuse at first, and if the preputial sac is first washed, the urine will be clear. If the foreskin can be drawn back, a small ulcer is found usually involving the glans, or there may be several, covered with pus. They may extend about the corona, but there is not the multiplicity or the recurrence about the frenum commonly found in chancroids. In a few days the severity of the symptoms is increased, the edema is worse, and there is great swelling, tenderness and inflammation in the foreskin. The

inguinal lymph glands are not usually involved. The discharge of yellowish, creamy pus is profuse and has a foul odor. The patient looks and feels sick, his face is pale, pulse increased, appetite diminished, and he usually has a temperature varying from 100° to 104°—*i.e.*, evidence of a general septicemia.

Definite diagnosis can be made by microscopical examination.

If the foreskin cannot be retracted easily, a dorsal slit is made under local anesthesia and the parts laid wide open. The infected area is thoroughly cleansed with hydrogen peroxide, using a small aseptic syringe to get the peroxide well into the crevices around and under the glans. The patient then immerses the penis for fifteen minutes in a hot 1:3000 solution of potassium permanganate, after which a loose bandage soaked in this solution is applied. The bandage is kept moist by the application of a fresh solution every half-hour. Every four hours it is removed, the parts again cleansed with peroxide, and the procedure repeated.

The temperature promptly subsides and the general septicemic symptoms disappear. After three or four days a line of demarcation appears and the necrotic area can easily be removed. It is not safe to stop the use of oxidizing agents until all evidence of active necrosis has subsided.

Roentgen Ray and Radium Therapy in Hypertrophied Prostates.

PHILIPS *(New York Medical Journal and Medical Record,* Sept. 5, 1923) believes that the abnormal involution of the prostate gland at the close of the sexual life of the patient is contributed to by long-continued irregularities on the part of the patient in sexual habits. His technique of treatment is as follows:

Four areas measuring approximately three inches square are marked off on the lower portion of the abdomen and over each groin, centering about the symphysis pubis, and four more areas posteriorly, over the region of the top of the coccyx, all conveniently arranged for cross-fire radiation of the prostate gland. Each area is treated successively with seventy-five milliampere minutes, nine-inch back-up, twelve-inch distance, through four millimeters aluminum. When this is concluded, an intrarectal application of one to two hundred milligramme hours of radium through brass and rubber is given, cross-firing on the prostate gland. About two weeks' time is consumed in the giving of this round of treatments, followed by two weeks of rest. Three rounds of treatments, as outlined above, suffice to produce sufficient involution of the gland to accomplish complete symptomatic relief, so that practically in every case the patient is completely relieved of obstructive symptoms at the end of three months. However, it is not necessary to wait this long for definite improvement, for in the uncomplicated cases improvement is noted in three or four weeks' time, with alleviation of most of the distressing symptoms, and by the end of the second series of treatments the patients are almost all symptom-free, many sleeping through undisturbed nights and no longer conscious of having urinary bladders.

He concludes his paper by the statements that *x*-ray or radium offers a painless, nonoperative method of reducing hypertrophied prostate glands and relieving prostatic obstruction.

The effects of radiation are due to destruction of the adenomatous structures in the glands and stimulation of the bladder mucosa and musculature.

Sterilization of the testicles with radiation produced no appreciable effect on hypertrophied prostate glands.

Exclusion of the testicles from direct and scattered radiation in the routine series of treatments caused no appreciable differences in the usual results.

Radiation therapy should supplant operation as the method of choice in the routine treatment of hypertrophied prostate glands, and operation should be reserved for radiation failures should they occur.

Preventable and Correctable Deformities of Childhood.

FISKE *(Atlantic Medical Journal,* September, 1923) classifies the physical deformities seen in infancy and childhood as congenital and acquired. The former are not preventable, but a very large percentage are correctable or subject to much improvement. The acquired deformities, on the other hand, are almost wholly preventable, and once established are also subject to correction. The logical inference from the foregoing is that deformity *per se* is largely unnecessary, inexcusable, and a stigma on the medical community where abundantly found.

A consideration of the problem of deformity also involves that of loss of, or interference with, function. The two are coexistent and interdependent. Function depends primarily on restoration of form, while the latter underlies physical mechanics.

For the child, deformity is the fundamental problem, if concomitant functional impairment and improvement are never overlooked.

Practically all acquired deformity may be considered preventable, except in cases of serious loss of tissue. In general, such prevention may be accomplished by:

Early protective or prophylactic splinting, along the following principles: (*a*) Maintenance of the proper functional position of limbs and joints. (*b*) Protection or relaxation of weak or paralyzed muscles, and overstretching of overstrong muscles. (*c*) Prevention of scar tissue contraction.

Physiotherapeutic measures, involving the use of open splints and early motion where continuous fixation is essential.

Correction of faulty habits of locomotion, attitudes and posture in lying, sitting and standing, and environmental influences.

The essence of all these measures is foresight; nowhere is the "ounce of prevention" more important. Incidentally such preventive methods, especially splinting, often comprise the fundamental therapeutic agents, thereby accomplishing both purposes.

The deformity or tendency to deformity is the result of a muscular imbalance, the relative overbalancing by a spastic muscle of its weaker normal opponent, as in the cerebral palsies, or by the stronger normal muscle of its weaker paralyzed opponent, as in the flaccid types, notably anterior poliomyelitis. At no time in the very early stages of these paralyses is it difficult to place the limbs in an absolutely straight position, and so maintain them, by the simplest splints or plaster. In general the lower limb should be held with the hip and knee extended, and the foot in right-angled dorsiflexion. The upper limb should be placed in an abduction or aeroplane splint if the shoulder (usually the deltoid) is involved, the elbow should be in partial flexion and semisupination, the wrist in moderate dorsiflexion, and the fingers semiflexed. If the trunk is involved, recumbency on a Bradford frame is the best method at first. For the specific case, however, the rule should always be to relax the weakened muscle and overstretch the strong opponent, wherever found. There is nothing new about this principle; it is the failure to apply it universally and at the proper time that warrants comment.

The muscular spasm of joint disease is largely eliminated by proper fixation or traction applied to the joint, so that it is rarely a factor in producing permanent deformity. If the course of the disease is such that ankylosis must ensue, it is usually possible at some stage in treatment to place the joint in its best functional position for ankylosis. The value of this is obvious; its neglect greatly increases the ultimate impairment. Secondary deformities, such as those produced by gravity, and extra-articular retraction, must also be foreseen and prevented.

In extensive wounds, deformity occurs from loss of tissue involving muscles and nerves, which are productive of a loss of balance between the opposing neuromuscular mechanisms of a limb, or by contracting wound granulations. This is particu-

larly true in suppurating wounds of long standing, such as extensive osteomyelitis, where the attention is focused on the primary condition. Here the functional end-result will depend as much on the position of the parts as on the integrity of the tissues; in fact, the healing of the wound is often of secondary importance. A modicum of prophylactic splinting will readily anticipate these unwelcome complications.

Most of the work which has been done for static and postural defects in both adults and children has been corrective. Nevertheless, such treatment is essentially preventive, as both primary and secondary factors tend to increase rapidly. The developments and sequelæ of faulty posture in the child, as affecting both the external and internal physical mechanism, are a serious menace to the health and efficiency of the adult. Probably 75 per cent or more of schoolchildren exhibit static defects. Moreover, a very large proportion of orthopedic conditions seen in adult practice are avoidable if seen early.

The outstanding difficulty, however, in early diagnosis of the milder postural case is that the child has no complaint, the parent is oblivious, and the physician is not consulted. The detection of round shoulders, hollow back, protuberant abdomen, uneven hips or shoulders, knock-knee, bow-legs and pronated feet is simple if systemic, and the same may be said of treatment. Properly conducted group exercises, postural training in standing and sitting, and supervision of clothing and improper habits, will produce remarkable results for the majority. The more advanced case, with definitely atonic muscles and established deformity, will demand individual attention, special exercises and braces.

So much can be accomplished by various manipulative procedures that there is often very little left for surgery, even in serious deformities. In the more acute cases, and in the absence of inflammation, forcible manipulation under an anesthetic, to break down soft callus and adhesions, stretch contracted ligaments and tendons, or reshape soft bone, possibly with the aid of an osteoclast or Thomas wrench, is alone necessary. For fixation after these measures, nothing serves the purpose so well as plaster of Paris, properly applied, and it may also be used for active correction, especially in sections for turnbuckle application or wedging. Splints and braces should be the lightest and simplest possible, for obvious reasons, and this precludes the heavy and expensive ready-made or store brace.

Mention should be made of the detection of deformity. Unfortunately, routine physical examinations as taught and made are very cursory as to skeletal defects and mal-alignments. Gross deformities and limps are readily observed; the minor or incipient case, often more important, is overlooked. The free use of the tape measure is somewhat of a remedy for this; a knowledge of normal joint movements and normal posture is invaluable. Attitude in standing, and gait, should never be neglected. There should be a routine for babies and infants, noting the position in lying, normal movements and muscular activity, the length of the legs, manipulation of the foot and larger joints, and examination of the spine. Many children would be spared serious physical defects in later life if this were oftener performed.

Prenatal Care and Puerperal Mortality.

ROBINSON *(Lancet,* Sept. 29, 1923) regards it as remarkable that there has been no appreciable reduction in the maternal mortality of childbirth during the last fifty years. He states that this must be due to one of two causes: either the lack of progress of obstetric medicine or a failure of the profession to take advantage of such progress as has been made. The second explanation is, of course, the only rational one.

It has not yet been realized that modern methods are essentially preventive methods, and that to be successful they must be initiated during the prenatal period. Thus the early prophylaxis of the toxemias, con-

tracted pelvis, and puerperal sepsis gives almost uniformly good results, whereas the latter continue to be disappointing if treatment is delayed until the disease or mechanical difficulty has reached an advanced stage.

It is absurd to argue that modern methods have failed because the mortality is still high in cases of convulsive eclampsia, ruptured uterus, or puerperal septicemia; on the contrary, such dangerous complications are almost impossible if prenatal care is exercised, and therefore the development of such advanced lesions is *per se* strongly suggestive of the neglect of modern methods. Some degree of failure to recognize and treat warning prodromata is inevitable so long as midwives continue to supervise from 50 to 75 per cent of all pregnancies, and while the general public remain indifferent, if not hostile, to routine prenatal work; but the very inadequate training of medical students and the exigencies and established usages of general practice are also responsible factors.

As a direct consequence the general practitioner is commonly compelled to undertake the treatment of obstetric difficulties in emergency without adequate assistance and often under grossly unsuitable conditions; or the case is admitted to hospital after unsuccessful interference at home, sometimes *in extremis*, or at least under circumstances highly "suspect" and dangerous, and which, in spite of the resources of hospital technique and equipment, may completely discount the value of otherwise safe and effective treatment.

Ectopic Gestation.

POLAK (*Boston Medical and Surgical Journal*, Sept. 27, 1923) states that from a study of nearly 400 cases of ectopic we may say that tubal gestation is found in three distinct groups of patients: First, in the woman who gives a previous history of some definite pelvic infection; this may have followed upon marriage—intrauterine instrumentation, abortion, childbirth, or intra-abdominal operation, which was followed by peritonitis. After recovering from the infection there is an intervening period of sterility, which has allowed sufficient time for the tube to partially regenerate, for the reëstablishment of its lumen, a lumen of sufficient size to permit the transit of the spermatozoa, but not large enough to allow the passage of the fecundated ovum. The largest number of all ectopics fall in this class. The second group consists of women presenting a history of dysmenorrhea from the first occurrence of their menstrual function, and who, on examination, show many developmental defects, such as a funnel pelvis, an infantile uterus, a narrow vaginal vault, long, tortuous tubes—in a word, those signs so commonly found in hypothyroidism. These patients have usually remained sterile after marriage for varying periods, and finally, following some procedure for the cure of the sterility, develop an ectopic. This makes up the developmental class, patients in whom it is not uncommon to find repeated ectopics. The third class is made up of women without any pathology who are constantly becoming pregnant. These women, apparently, get an ectopic in passing, due to an overgrowth of the fecundated ovum before its transit through the tube has begun.

Under this head we might also class the woman who has been operated for retroversion, by one of the round ligament operations, which has been poorly selected, and which, as a consequence, has angulated a relatively normal tube, and has caused an arrest of the fecundated ovum. It is generally admitted that, except for a few authenticated cases of ovarian pregnancy, all ectopics are primarily tubal.

Anatomically, there are three points in the tube at which the ovum is commonly arrested: (1) in the ampulla, just distal to the neck; (2) in the isthmus; (3) in the interstitial portion of the tube. The occurrence at these points bears an almost constant ratio of 76, 21, and 3 per cent, respectively. The basic reason for the occurrence of abnormal symptoms in

ectopic is the absence within the tube of a well-defined decidua.

The cardinal symptoms of early tubal pregnancy may be summarized as follows:

A missed menstruation, a postponed menstruation, or a prolonged menstruation.

The sudden onset of abdominal pain, with or without shock, often referred to one or the other lower quadrants of the abdomen; always followed by a bloody vaginal discharge, which is dark, fluid, and does not clot.

A sensitive cervix, sensitive to the slightest motion on vaginal examination.

A tender mass beside or behind, or rarely in front of, the uterus, displacing it.

A slight elevation of temperature, usually not over 100.4°.

A leucocytosis of 15,000 or more, immediately following the attack of pain, with its bloody vaginal discharge, and,

Finally, exacerbations of pain, and gradual enlargement of the tumor mass, with slight elevation of temperature, while the patient is under observation. These make up the symptom-complex.

As in uterine pregnancy, tubal pregnancy may terminate in abortion, and tubal abortion is the most common form of ectopic gestation, and as in the uterus it is frequently incomplete; tubal rupture is less common.

When the ovum is arrested in its progress through the tube, it immediately attempts to erode itself into the mucosa, which, being unprotected by a well-formed decidua, allows villous penetration of some of the smaller radicles in the submucosa. This is followed by hemorrhage into the decidua, and increase in the tube contents, overstretching it and giving rise to two of the earliest symptoms, namely, a feeling of soreness and tension, and shooting, knife-like pains, tube colic, evidencing the attempt of the tube to expel its foreign content. If one looks at the pathological specimens of unruptured tubal pregnancy, one will see a tube distended to many times its diameter, edematous, with areas of ecchymosis, where hemorrhage has taken place into the tube wall, the result of the villous erosion. This blood accumulation between the ovum and tube wall causes partial separation of the ovum or threatened tubal abortion, and just as we get bleeding in threatened uterine abortion, so we have bleeding in tubal abortion, but instead of coming out through the uterus, it comes out through the free end of the tube, gravitates to the cul-de-sac, and with the tube, which because of its increased weight has dropped downward and backward, displaces the uterus forward, and makes up the cul-de-sac mass so characteristic of ectopic.

The blood in the cul-de-sac causes a chemical reaction in the peritoneum, which causes the symptoms of temperature, leucocytosis, and sensitiveness of the cervix, for the overlying peritoneum is edematous and sensitive, and when the cervix is moved the utero-sacrals, covered as they are with peritoneum, respond by spasm and pain.

This unrest in the tube is transmitted to the uterus, and the decidua there becomes intensely congested, and some bleeding takes place, while the cervix softens and opens. Should the ovum die, the decidua in the uterus, being no longer needed, will be cast off, either as a cast, which is unusual, or piecemeal, which is the usual manner in which the decidua is passed. During this time there is a bloody vaginal discharge, which is characteristic. It is brownish-red, mixed with mucous fluid, and does not clot.

When the tubal abortion occurs the clinical picture may be summarized as follows: A delayed, prolonged, or anomalous menstruation with continuous metrorrhagia. There may be pain or no pain, but there is usually soreness in one or the other lower quadrants. Physical examination reveals the characteristic bloody discharge, the sensitive cervix, and a sensitive mass in the posterior or lateral cul-de-sac. Tubal abortion usually occurs before the sixth week, while rupture seldom takes place before the eighth; when it does occur, what happens to the ovum depends on the site of

the pregnancy, and the location of the rupture. The majority of isthmic pregnancies rupture into the folds of the broad ligament, and proceed either as an intraligamentous pregnancy, or die within the ligament, leaving a hematoma to become infected or absorbed. When rupture occurs and the patient passes from the non-tragic into the tragic stage, the severity of her symptoms depends on the location of the point of rupture and its proximity to the larger blood-vessels coursing along the tubes. Fortunately, the primary rupture in most cases is not fatal, and sufficient time is given, if the practitioner is always on the alert for an ectopic, to make a diagnosis possible. Any woman is liable to ectopic; where there is anomalous bleeding, a skipped menstruation, and abdominal pain, even when it is attributed to indigestion, ectopic should be suspected. When there is painful defecation or rectal tenesmus, associated with vaginal bleeding, always think of ectopic. When called to see a woman in collapse, with any of the appearance of internal hemorrhage, always diagnose ectopic, for in the majority of cases you will be right, and in all cases she presents a surgical proposition.

Diathermy Treatment of Gonorrhea in Women.

Milner and Maclachlan (*Lancet*, Sept. 29, 1923) note that the usual condition found on examining a female with acute gonorrhea is that there is a discharge from the urethra and cervix, and that the latter is eroded to a greater or less extent. The discharge from both contains pus and gonococci. From the os uteri the discharge varies; at first purulent, it later tends to become mucopurulent and ropy. It is in this condition that one sees most of the cases: and in the subacute or chronic stages when the detection of the gonococcus is very difficult. In an acute case, the treatment of the urethra by lavage, with sounds and urethroscopic treatment to follow, will usually clear up the condition, but at the cervix uteri the latter is very persistent; treatment with the various medicated packs and tampons apparently produces little result, and the condition goes on until the chronic stage is reached, this state of affairs occurring even in cases restricted to bed.

It appears obvious that as heat kills the gonococcus easily in culture, it only requires sufficient heat to kill it in the tissues; as diathermy produces heat to the necessary extent, by this means the cervix can be raised to such a temperature as will destroy the germs without burning the cervix. Georges Luys states that in culture the gonococcus can grow between 32° and 38° C., and that six hours at 40° will kill it.

Experiments carried out at the Military Hospital, Rochester Row, demonstrated that half an hour at 104° F. (40° C.) is a lethal dose for the organism. A minimum temperature of 104° F. is necessary, and it must be maintained for about an hour. These conclusions were arrived at in the treatment of men. The intraurethral temperature of both the anterior and posterior urethra was taken every five to ten minutes, and in cases in which gonococci disappeared and were cured the temperature of every part of the urethra was not on an average maintained at 104° F. for longer than one hour.

In order to follow the technique of the treatment it is necessary to understand the physical properties of diathermy, and to dissociate it entirely from conducted and radiated heat. It would be impossible by conducted heat to maintain the temperature necessary to effect a cure in the submucous tissues which have been penetrated by gonococci without burning severely the superficial columnar epithelium. By diathermy the superficial and deep parts can be equally heated; for it is penetrating, it passes through and through from one electrode to another, and is therefore ideal for the purpose. The amount of heat generated and maintained in any part under treatment does not entirely depend on the amount of current used, but on several other factors,

one of the most important being the vascularity of the part. The more vascular the part the quicker the heat is carried away. The part of the body between the diathermy electrodes may be compared to the furnace of a radiator system.

It will be realized that any technique that retards the flow of blood through the part treated will raise the temperature of the part; this may be done by pressure of the electrodes, or compression of the vessels above or below the electrodes. The size of the active electrode exerts a powerful effect on the local temperature.

The two electrodes used in the treatment are of different sizes, the larger being the indifferent, while the smaller is the active electrode; the smaller the active electrode the greater is the concentration of heat around it. By reduction of the size of the active electrode a stage is finally arrived at when coagulation of the tissues takes place around it. The diathermy then becomes surgical. A cylindrical electrode three-quarters of an inch long and one-eighth of an inch in diameter, with rounded end, will be found the most convenient active electrode to use when the disease is a gonorrheal cervicitis and endometritis. The circular discs should vary in size; the largest size that can be introduced through the speculum should be used.

The patient having already been douched and placed on the couch in the lithotomy position, the indifferent electrode measuring 20 x 10 cm. is wrapped in a thick pad saturated in hot saline solution, and fixed by means of a binder on the abdomen as near to the pubes as possible. The cervix, os uteri, and urethra are cleansed with swabs. As large a speculum as possible is now introduced.

The active electrode is screwed on to the holder and passed down the speculum; the stem of the active electrode is introduced into the os uteri with care, and the circular disc is then pressed gently against the cervix. Before the current is applied the speculum is slightly withdrawn to avoid contact with the active electrode. No overlapping of the vaginal wall should take place, the circular disc of the active electrode being kept in view throughout the treatment. The current is gradually increased; the temperature which it is desired to maintain is 107° F.

The sensation of heat felt by the patient is not a good guide; the cervix is peculiarly insensitive to heat; a superficial burn may occur without the patient suffering any discomfort. The temperature of the os was taken before the treatment commenced and was found to be on the average 99.2° F. The temperature after treatment of five to ten minutes varied from 102° to 112° F. The ordinary clinical thermometer must register within half a minute, and must be introduced into the os very quickly if the correct rise is to be registered, as the part is so vascular that the temperature drops to normal very rapidly when the current is cut off.

To treat gonorrheal urethritis the indifferent electrode is drawn well down to the pubes; after lavage and swabbing of the urethra an active electrode which consists of a cylindrical metal rod five-eighths of an inch in diameter and of convenient length is introduced to the extent of 2½ inches into the vagina and pressed in an upward direction against the vestibule and urethra. More current will be required than for the treatment of the cervix—usually about 1½ amperes is sufficient to maintain the intraurethral temperature at 106° F. The treatment is given for ten minutes and repeated five or six times, when a cure should be effected. Smears should be taken the day after each treatment. No diathermy electrode should be introduced into the urethra on any account; the necessary lethal temperature can be attained with ease without this expedient, and all chance of a burn of the urethra avoided.

As in the case of the urethra, the duration of treatment to the cervix and uterus should be for ten minutes, provided that the temperature is maintained throughout at an average of 107° F. The results of dia-

thermy are marked: the cervical erosion heals rapidly, the discharge becomes less, and gonococci gradually disappear from the smears. With a continuation of treatment the mucopurulent ropy discharge disappears, and quite clear mucous secretion without any gonococci in either smear or culture is then left.

The burn which has been mentioned several times in the course of these observations differs entirely from an *x*-ray burn, or the burn which originates from the electrode of a galvanic battery. The latter are sometimes most difficult to cure. Most surgeons are now familiar with the wound caused by surgical diathermy. The burn which has occurred in some of the cases is a very superficial surgical diathermy coagulation, and there has been no difficulty, in spite of the previous infection, in obtaining complete healing.

Arsphenamine and Neoarsphenamine.

MERRITT *(The Military Surgeon,* September, 1923) publishes the report of an experience with more than 1600 injections made over a period of five years, administered to 373 individuals. He classifies the reactions as follows:

Immediate table reactions: (*a*) nitritoid crises which are acute anaphylactoid reactions occurring at the time of administration of the drug; (*b*) collapse resembling closely surgical shock.

Intermediate reactions. These come on from two to forty-eight hours after treatment, but usually within twelve hours. They consist of headache, nausea, vomiting, diarrhea, abdominal pain, and perhaps chills. One may meet with all or any of these symptoms.

Late reactions: Hemorrhagic encephalitis, which is very rare: (*a*) jaundice due to toxic hepatitis from arsenic (which reaction Stokes and Reudman observed to have increased 1000 per cent in their cases from 1918 to 1920); (*b*) rashes of erythema scarlatinoides type due to poisoning of the skin with arsenic. Such rashes may vary from a mild erythema to a fatal exfoliating dermatitis.

It must be borne in mind that reactions in man are intimately connected with the large volume injected intravenously in the course of arsphenamine treatment. Neoarsphenamine requires but about one-fifth to one-thirtieth the volume that is necessary in using arsphenamine.

All of the patients listed in this report received mercury and arsenicals, and most of them also received potassium iodide.

There were 448 injections of salvarsan of Metz administered to 110 patients, all of whom were males. The youngest was sixteen years of age, the oldest forty-nine. All of these men had either a positive Wassermann or dark field plus clinical evidence of infection. Twenty-eight had primary lesions, sixty-four had secondary lesions, and eighteen had tertiary lesions. The greatest number of injections administered to one individual was nine, the smallest number one. Of this total number of injections there was a reaction of some sort following 439. Nausea and headache followed 294; nausea and vomiting followed 94; nausea and vomiting together with a febrile reaction followed 51; no reaction whatever in only 9. The majority of these patients showed the greatest reaction after the second and third injections. The dose at each treatment in these cases was 0.6.

The second series to be tabulated deals with 674 injections of ansenobenzol of the Dermatological Research Laboratories, Philadelphia, administered to 200 individuals. Of these 156 were males and 44 were females. The youngest patient was seventeen years of age, the oldest fifty-nine. Sixty-five showed a primary lesion, one patient having multiple chancres with a positive dark field from each lesion. One hundred and eighteen had secondary lesions, and seventeen had tertiary lesions. The greatest number of injections administered to one individual was thirteen, the smallest number one. One patient collapsed on the table, but recovered. Two had dermatitis exfoliativa; one moderately, the other so

extensively that he lost his entire epidermis, hair, eyelashes, finger-nails, and toe-nails. The peculiar part of this latter reaction was that it came on after the second injection, whereas, according to the literature on the subject, this type of reaction usually follows intensive treatment. The patient was in the hospital three months before he entirely recovered. Simple nausea followed 207 injections; nausea and headache followed 103; nausea and vomiting followed 117; nausea and vomiting and a febrile reaction followed 96. No reaction whatever followed 151. The dose in each of these injections was 0.6, the same as in the preceding series.

The third series deals with the arsphenamine distributed by the State of Massachusetts. This is given to physicians free of charge upon application. There were but 65 injections of this drug administered to 14 patients. Of this number six were females and eight were males. The youngest was eleven years of age, the oldest sixty-one. There were 36 injections administered to the females and 29 to the males. The first dose in each case was 0.4 and the others 0.6. Every injection was followed by severe nausea, vomiting, flushing of the face and conjunctivæ, and febrile reaction.

The number of injections followed by no reaction is very small, there being only 160 out of 1187. All of these injections were given by the old gravity method in a dilution varying from 50 to 300 cc. The treatment was given while the patient had an empty stomach, following a laxative the night before. The time for injection averaged six and a half minutes, and distilled water or sterile saline as required was used in all of these injections. The patient was given the treatment while flat on his back, the arm extending out on to a small glass-topped table covered with a towel.

The next series deals with the product neoarsphenamine of the D. R. L., Philadelphia, the only brand of this product used. There were 422 injections of this drug administered to 49 individuals.

Simple nausea followed 164 injections; nausea, vomiting and a febrile reaction followed 47; and one had dermatitis exfoliativa to a very slight degree. No reaction whatever followed 210 injections. It is interesting to note that the patient developing the dermatitis exfoliativa was one of the two who two years before developed the same condition following the injection of 0.6 arsenobenzol.

All of the above injections were administered with a 10-cc Luer syringe, the patient sitting up with the arm extended on a small table. Distilled water was not used at all, the drug being mixed with sterile water only. The time of injection was never more than forty seconds, and many were given in less time than that when the veins were large and prominent. In this series not a single patient collapsed, in spite of the upright position and the short time of injection. Injections were given at all hours of the day, and it apparently made little difference whether or not the stomach was empty.

The author concludes that:

Neoarsphenamine is as valuable a therapeutic agent as arsphenamine.

A reaction of some sort, although often slight, is to be expected in from one-third to one-fifth of all injections.

Neoarsphenamine is not as toxic as arsphenamine.

Neoarsphenamine, because of the fact that it can be used in such small dilution, causes less shock to the patient and is thus more to be desired than arsphenamine.

The Use of Cocaine in the Urethra.

GARDNER *(American Journal of Surgery,* October, 1923) speaks of calcium chloride as an antidote to cocaine poisoning. In his office he uses a cocaine solution in the urethra which has preceded over 50,000 examinations or treatments. There have been no fatalities or serious symptoms. He began by using a 4- to 8-per-cent solution of cocaine before passing instruments; this

in 1898. He then substituted other local anesthetics less toxic and less powerful. He later tried alkalinization of cocaine solution, finding greatly increased efficiency in weaker solutions. He dissolves a grain sodium bicarbonate tablets and 1⅛-grain cocaine tablets in 30 minims of water, making a 4-per-cent solution; in two drachms of water a 1-per-cent solution; and in one-half ounce of water 0.5-per-cent solution. An aseptic half-ounce syringe has been found to be convenient for administering the solution in the anterior and posterior urethra. One has much better control than when the plunger type is used.

In cystoscopic and endoscopic manipulations and dilatation of slight strictures he finds that a 1-per-cent solution gives good results. The solution should be injected slowly and the urethra distended for at least a minute to insure a satisfactory anesthesia.

The symptoms from mild and transient toxic action of cocaine are generally overlooked or are ascribed to the patient's nervousness, but absorption of the drug may include vomiting, palpitation, dizziness, and sweating or collapse, or even death. All drugs of this type kill by simultaneous paralysis of the heart and respiratory center. The employment of artificial respiration with intravenous injection of epinephrin is indicated, so that the body has a chance to eliminate the drug. It is to be remembered, however, that serious intoxication has been seen in man following extremely small doses of local anesthetics, suggesting the occasional existence of a marked degree of hypersusceptibility, and in such cases doses that are relatively small as compared with the average dose commonly employed may actually be several times the minimum that would be fatal in a particular individual, so that even the most effective resuscitation may fail under these circumstances.

Alkalinization increases the efficiency from two to four times. The mixture does not keep well and should be freshly made. The addition of epinephrin does not increase efficiency and is probably useless. The addition of the alkali serves no good purpose for infiltration, but markedly increases efficiency for use on a mucous membrane, with the exception of quinine-urea.

The Application of Physiological Principles to the Treatment of Arthritis.

Timbrell Fisher *(Lancet,* Sept. 15, 1923), after discussion of the structure, nutrition, repair, and function of cartilage, observes that in the non-infective types of arthritis, such as those due to traumata, a combination of rest and skilfully applied movement is of great advantage. The rôle of movement in acute inflammation of joints is naturally a limited one. In cases in which the articular cartilages have been destroyed the pain and spasm produced by even the slightest movement are so intense that it is ruled out of practical politics. Furthermore, there is serious risk of general dissemination. However, in cases in which the suppuration is largely limited to the synovial membrane excellent results may accrue, if free drainage is provided.

The author recalls a case of suppurative arthritis of the knee-joint treated by two long lateral incisions and two incisions in the popliteal space through which the joint cavity was periodically irrigated with eusol. The patient's condition became steadily worse, and the only alternative seemed amputation, whereupon the effect of movements was tried. On the first movement there was a gush of pus from the drainage sites. The patient recovered with full and painless mobility. Some years later when seen the joint appeared perfectly normal. The patient was able to hop about on the leg of the affected side. The rationale underlying this treatment depends not only upon the prevention of ankylosis but upon the improved drainage that occurs. During flexion and extension certain synovial recesses are compressed and others cease to exist, and the pus, taking the line of least resistance, escapes via the openings for drainage. If the latter did not exist

there would undoubtedly be risk of diffusion of the septic material along intermuscular planes.

The value of movement in chronic nontubercular arthritis of the osseous and synovial types respectively is particularly important. If joints thus involved be put in complete rest, the synovial membrane and capsule undergo sclerosis, movement is still further obstructed by osteophytes developing at the articular margins, there is secondary shortening of tendons and other periarticular structures, and the joint slowly but surely becomes more and more fixed, often in a position of gross deformity. There exist thousands of men and women who drag their stiff and deformed joints from one spa to another, and whose deplorable condition might have been prevented by remembering the dictum that "movement is life." These deformities are nearly all preventable by attention to three main principles, and it is unfortunate that many text-books still speak of the stage of "sequels" as if the latter were inevitable and unpreventable. These principles are as follows: The joint or joints should be put through the full range of movements daily, although overexertion is to be avoided, every effort being made to preserve the nutrition of the joint structures and to maintain muscular tone.

In most articular cases, particularly in the lower extremity, the principle of diminution of intra-articular pressure is to be observed.

The cause must be simultaneously attacked. There is no greater misapprehension than to imagine that chronic nontubercular arthritis is of necessity a disease which steadily progresses.

The movements cause the osteophytes to develop in such a way that they do not interfere with movement. In other words, it is possible to train up an osteophyte in the way it should grow. It is not sufficiently realized that in many of the aforementioned sufferers the disease has come to an end and that their symptoms are caused by the deforming stiffness. Medical treatment is of doubtful benefit in this type of patient. The locked joint is crying out for movement. This can be restored by various surgical measures, but particularly by manipulation, a most valuable procedure in suitable cases. The results are sometimes almost dramatic: patients have been restored from lives of painful crippledom to comparatively painless activity.

Manipulation is not advisable in the more acute forms, as it may give rise to a reaction, after which the joint gradually stiffens once more. It is never necessary, and it may be dangerous, to use extreme force. Such a procedure, especially in feeble or debilitated individuals, may be associated with considerable shock, and in these cases it is well to be contented with gradual restoration of full movement by repeated manipulation. Whole-hearted coöperation by the patient in the after-treatment, which may be long, and optimism on the part of the surgeon, are invaluable adjuncts. It is obvious that where movement is obstructed by osteophytes, and in certain other cases, open surgical operation may be indicated.

In rheumatoid arthritis, where there is a greater tendency to limitation of movement, the same lines of treatment are indicated. If anything the indications are even greater, since there is a special tendency in this disease for adhesion between articulating surfaces to occur.

As to chronic synovitis with effusion it has long been known that pressure is a valuable factor in bringing about the absorption of "water on the knee" and other joint effusions. We should bear in mind, however, that the amount of movement should be carefully regulated; for excessive movement will almost certainly cause an inflammatory reaction with the outpouring of an increased amount of fluid.

When an injury has caused a loss of substance of the articular cartilage, with exposure of the subjacent cancellous bone, in the absence of movement the irruption of connective tissue from the exposed cancellous spaces is apt to form a bond of union with the opposing articular cartilage. If

there is a corresponding loss of articular cartilage on the opposed surface, such adhesion is even more likely to occur. Early movement is imperative in such cases, and there is no evidence that movement, however early, militates against repair of the articular surfaces.

As to early excision with the object of securing a movable joint, movement would seem to be a more effective means of attaining the desired end than the interposition of a fascial flap. The argument that a fascial flap is necessary for formation of a new synovial membrane appears somewhat unsatisfactory when we consider that the connective tissues are perfectly capable of constituting quite excellent synovial membranes without any outside assistance as we see in false joints.

The Anticoagulating Action of the Arsenobenzols on Blood.

Anwyl-Davies and Mellanby *(Lancet*, Sept. 15, 1923) as the result of laboratory study and clinical experience find that some of the arsenobenzols (neosalvarsan, sulfarsenol, novarsenobillon) when added to blood to the extent of 0.1 per cent prevent its coagulation. This inhibition is due to the action of the arsenobenzol on the fibrinogen, probably by direct combination with it. The combination of the arsenobenzol with fibrinogen depends upon the organic grouping, since arsenious oxide has no effect on the coagulability of the blood, nor does arsenobenzol combined with glucose (stabilarsan) alter blood coagulation. Arsenobenzol, 0.1 per cent, inhibits the coagulation of blood not only *in vitro* but also *in vivo*. But in the animal body the inhibition of coagulation passes off within an hour, probably owing to the passage of the arsenobenzol from the blood into the tissues.

Therapeutic doses of the various salvarsan preparations intravenously injected into men or women have practically no effect on the coagulability of the blood, since these quantities fall far below the minimum amounts required to produce fluid blood. Further, the arsenobenzols do not appear to accumulate in the blood and thereby effect its coagulability, since even after prolonged courses of administration the coagulability of the blood remains normal. Hence, previous treatment with absenobenzols, from the point of view of the blood coagulability, need not be seriously considered when surgical operations are in question.

Reviews

The Insulin Treatment of Diabetes Mellitus. By P. J. Cammidge, M.D., D.P.H. William Wood & Company, New York, 1924. Price $2.

The author tells us that although the discovery of insulin was announced only in 1922, so large a volume of literature has grown up around it that he has been asked by the English publishers to provide a summary of our present knowledge concerning it. After stating that the first insulin used in Great Britain was made in his private laboratory, as soon as details for its preparation could be obtained, he points out the importance of blood analyses and then emphasizes his belief, as expressed in his earlier statements, to the effect that insulin has not proved to be a "cure" for diabetes in the ordinary accepted sense of the word "cure." It seems to us that this decision has been universally reached, indeed that no other conclusion could have been reached by any one who had an accurate knowledge of the subject. Cammidge goes on to state that insulin is undoubtedly the greatest discovery yet made in connection with the treatment of diabetes, but emphasizes the

point that it has its limitations and its dangers, and that its indiscriminate use is to be strongly deprecated. He also believes that the insulin treament of diabetes is largely in the experimental stage, and that further experience will probably lead to some modification in its use. Naturally a very large part of the text is devoted to a consideration of the dietary methods which should be carried out, and with a discussion of glycosuria, diabetic coma, and the difficulties which surround the employment of insulin by the general practitioner.

Finally, he makes the assertion that insulin is not to be used simply because sugar is in the urine, but only after a definite hyperglycemia has first been established by blood analysis before and after a test record of known composition. He then adds that the presence of 0.2 per cent or more of sugar in the fasting blood may be taken as an indication that insulin may be used with safety, probably with benefit, and particularly is this true if ketonuria is present.

Altogether the author has succeeded in presenting a very fair, and certainly not too enthusiastic, summary of this important subject.

PROBLEMS IN TUBERCULOSIS. By Sir James Kingston Fowler, K.C.V.O., C.M.G., M.A., M.D., D.Sc., F.R.C.P. The Oxford University Press, New York, 1924. Price $1.50.

Sir James Fowler has been known to the medical profession for many years because of his contributions to the subject of pulmonary infections. In this little book of 63 pages we find no less than 52 illustrations. It deals with administration, diagnosis, employment and settlements for the tuberculous, and is, therefore, particularly interesting to those who deal with tuberculosis either as health officers or as medical men in charge of institutions for patients suffering from this infection. Naturally it does not deal in detail with the medical treatment of such patients, but at the close of the volume under the head of Obiter Dicta the author has put in a number of statements which he thinks are useful or amusing, as, for example, "Hope and work create vitality;" another, "Strange things may happen when a clinician who has 'scrapped his stethoscope' calls in a radiographer who is not a pathologist;" and again, "When the struggle against tuberculosis began no one knows, when it will end no one can tell;" and still again, "A sanatorium is an atmosphere, not an institution." Finally we may quote still another aphorism, to wit, "Peribronchial tuberculosis is prevalent in America, but unknown in France." Exactly what is meant by this is not clear, because some of the most thorough considerations of infection of the mediastinal lymph nodes have appeared in French medical literature during the last ten years.

HOW OUR BODIES ARE MADE. By R. M. Wilson, M.B., Ch.B. The Oxford University Press, New York, 1924. Price $1.75.

We are told in the Preface of this book that it is intended for very young people, and for this reason the descriptions of bodily functions are simplified as far as possible, and illustrations used which, it is hoped, will serve to explain ideas otherwise difficult to understand. As a matter of fact it is practically a little handbook to tell parents and children how to carry on in life. Some of the diagrams are very cleverly designed; for example, there is a picture of a large tooth, and inside the outlines of the tooth is the picture of a knight in armor; there are arrows pointing to different areas of the tooth where disease is most prone to attack it. Another clever diagram is one showing the outlines of the face in which the maxillary, frontal, and sphenoidal sinuses are represented as big drums and little drums, and it is asserted that these drums are designed to increase the volume of the voice whereby the effect of a cold in the head on the voice may be the more readily understood. Then, too, there is another diagram showing a row of five houses to each of which runs a branch from a cable. This is designed to show how the spinal cord is like a cable bringing electric light to a row of houses. A diagram of a head and leg shows the telephone wires to and from a foot that has trodden on a pin.

Altogether this is one of the cleverest attempts to interest children in their own anatomy that we have ever seen. At times emergency measures, as the control of hemorrhage, are brought into play. Many books designed for the laity mix up science with ordinary facts in a hopeless fashion. This one does not. We believe that it can be put not only safely but with advantage into the hands of many children who are able to read.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., assisted by L. F. Appleman, M.D. Volume I, March, 1924.

As in previous years this issue of Progressive Medicine opens with an article upon the Surgery of the Head, Neck and Breast, by Dr. Charles H. Frazier. It is an able summary of the literature which has appeared under these titles during the last twelve months, and its value is very materially increased by the fact that it is not only well composed but also benefited by the criticisms and expressions of personal opinion on the part of the author, who has now had a large experience in the surgery of these parts of the body.

Following this article there is one upon the Surgery of the Thorax by Dr. George P. Müller, which also bears the imprint of the writer's personal views, whereby the reader gets a critique as well as an abstract of the important papers of the year.

The third article, which naturally has to be a long one because of the wide area of its subject, is contributed by Dr. Arthur L. Bloomfield of Baltimore upon the Infectious Diseases, including Rheumatism, Croupous Pneumonia, and Influenza. Here again we find that the author has been successful in taking from the literature of the past twelve months the really important matter which has appeared and placing it in readable form.

The fourth article upon Diseases of Children, by Dr. Stafford McLean of New York, while naturally a briefer one, nevertheless is well balanced in its description of scientific advance and bedside experience. The volume closes with an article of 84 pages upon the advances made in Rhinology, Larynology and Otology, by Dr. E. C. Sewall of San Francisco.

THE MEDICAL CLINICS OF NORTH AMERICA, March, 1924. The W. B. Saunders Company, Philadelphia, 1924.

The contributors to this issue are clinicians resident in St. Louis. The subjects cover almost the entire realm of internal medicine, beginning with a clinic by Dr. William Engelbach on Pituitary Tumor, followed by one by Dr. Kinsella on Hypertension and Nephritis, and others by Marriott upon Nephritis in Children, and one by Veeder upon Some of the Diagnostic Problems of Lobar Pneumonia in Children. There are other clinics upon such practical subjects as Headache, Non-diabetic Glycosuria, the Use of Digitalis in the Treatment of Patients with Different Types of Heart Disease, and one by Olmsted on the Value of Weight Curves in Determining the Severity of Diabetes. The closing article is by Dr. Neilson upon Focal Infection in General, with Special Reference to the Prostate.

AIDS TO PRACTICAL PATHOLOGY. By F. W. W. Griffin, M.D., and W. F. M. Thompson, M.D. William Wood & Company, New York. Price $1.50.

This little manual, originally printed in Great Britain, is designed for students and attempts with considerable success to present the theme with which it deals. As a matter of fact a better title for the book would have been "Aids to Laboratory Examinations," as almost all the text is devoted to the examination of the urine, the blood, the feces, gastric contents, and milk. Only fourteen pages are devoted to the examination of tissues.